RAILROAD GAZETTE

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The Traveling Engineers' Association.

The third annual convention of this association was held at Pittsburgh, Pa., Sept. 10 and 11. President C. B. Conger in his opening address referred to the prosperity of the Association and the work it is accomplishing in educating engineers and firemen. An interesting part of his address was the reference to the possibility that engineers will be required to get themselves in readiness to use electricity instead of steam. He said: There is a great deal of discussion among the men in the operating departments concerning the use of electricity as a motive power, but it does not seem likely that many regular trains will be run by that power during the coming year except on suburban passenger roads and short runs, where a large number of light passenger trains are handled. The success of the motor used by the Baltimore & Ohio in the Baltimore Belt line tunnel shows that these motors can be used to do the heaviest kind of work, while the motors on the N. Y., N. H. & H., at Nantasket branch, have developed high speed.

The Association listened to an address by Mr. J. T. Brooks, Second Vice-President of the Pennsylvania Company, who gave the members some sound advice, and complimented them highly on the good work they have accomplished as individuals and as an organization.

The secretary's report showed an increase of 15 per cent. in the membership during the year, making 169 members in good standing; also that the association was in a good financial condition. Of the second annual report 1,750 copies were distributed.

The first subject discussed was the effect of manipulation of the throttle, cut-off and boiler feed on coal consumption. (See abstract of this and other reports below). It was discussed generally until the convention adjourned for dinner. At the afternoon session the first subject was: How can the traveling engineer prevent the unnecessary emission of black smoke? It appeared, from the experience of those who spoke, that with an engine equipped with appliances mentioned in the report and in the hands of a skillful engineman the smoke nuisance could be reduced to a reasonable minimum, even in large cities. This subject closed the first day.

On Wednesday The Art of Air-Braking took up the whole forenoon, the report of the committee, very thorough and complete, provoking much discussion. In the afternoon the members visited the Westinghouse Air-Brake Works. In the evening the question how to instruct engine and trainmen in air-brake practice, with out an instruction car, was discussed. The report was regarded as an excellent one, and the answers to the questions propounded by the committee contained a great amount of information of a practical character. The report on a form of report to show a record of the character and qualification of enginemen and firemen, which was accompanied by a blank form, brought out a long discussion. A committee was appointed to formulate a card to be filled out by the traveling engineer for every engine that he had occasion to ride on, that could be filed in the master mechanic's office. The report on the question, Could not the locomotive service be improved if the furnishing of feed water and coal were in the hands of the locomotive department, developed such a diversity of opinion that the subject was carried over another year.

The committee on the question, How can traveling engineers improve the service in rating engines—tonnage versus number of cars—was presented in an able manner by the committee, and was discussed at length. A number of good papers on the subject were read by members representing different roads that are rating engines by tonnage. The question will be carried over another year.

There were 75 members in attendance, representing 60 roads.

The election of officers resulted in the continuance of the previous board as follows: President, C. B. Conger (C. & W. M.), Grand Rapids, Mich.; First Vice-President, R. D. Davis (I. C.), Chicago, Ill.; Second Vice-President, Geo. H. Brown (C., M. & St. P.), Dubuque, Ia.; Treasurer, D. R. McBain (M. C.), Jackson, Mich.; Secretary, W. O. Thompson (L. S. & M. S.), Elkhart, Ind. T. A. Hedendahl (U. P.), Omaha, Neb., was elected a member of the executive committee, to succeed W. T. Hamar, whose term of office had expired. Minneapolis, Minn., was chosen as the place of the next annual meeting.

After the convention adjourned the members visited the Pittsburgh Locomotive Works, the Galena Oil Co.'s works at Franklin, Pa., and the extensive shops of the Pennsylvania Railroad at Altoona.

COMMITTEE REPORTS.

HOW TO INSTRUCT IN AIR-BRAKE PRACTICE WITHOUT AN INSTRUCTION CAR.

The committee on this subject, George Holmes, Chairman, made a report of considerable length, consisting largely of replies to inquiries, many of which were comprehensive. The instructor must be able to put all his theories into practice, in order to enforce respect and confidence. Searching examinations must follow all instruction, or the results will be very small in comparison with the labor expended. Even the best men will become rusty if the examinations are not repeated. It is important to give instructions at least once a year, requiring every one to show a certain percentage of proficiency. The examiner himself should have a certificate from some high authority on air-brakes, which aids him in coming to a complete understanding with both his superiors and his pupils.

For the examination of enginemen and firemen the committee recommends the list of questions shown on page 133 of the Annual Report of the Association last year; for trainmen, the present report suggests a series of 30 questions. These questions, while not numerous, are sufficiently difficult to test the knowledge of any trainman. One of the best replies received by the committee was from a man who uses as a substitute for an instruction car a locomotive and passenger car placed side by side, on parallel tracks, with the brakes connected so that the engineman in the cab can see the gages in the car. Additional cars are coupled on to show the effects of unequal piston travel. A blackboard is used to give illustrations of excessive pressure, equalization of pressure, etc. The charts in the Westinghouse instruction book are used, and copies of the book are passed around among the men to great advantage. With oral instruction alone, pupils will return a day or two after the school with mistaken ideas of what you said. It is desirable to have each pupil take all his instruction continuously, or within as few days as possible.

RECORD OF CONDITION OF LOCOMOTIVES.

The committee on this subject, J. H. Little, Chairman, submitted a form of blank in which the qualifications of the engineman are to be noted under four heads, of the fireman under three heads and the condition of the engine under four heads. Under each one of these, the traveling engineer can indicate by a single figure whether his estimate is very good, good, medium, poor, or very poor. In addition to the features shown on the blank sent out with the committee's circular, it is now suggested that the dates when the boiler was last tested and when the staybolts were last tested should be shown on the report; also, there should be a column in which to note defects in air-brake apparatus.

FUEL AND WATER SUPPLY.

A committee, of which W. R. Scott was Chairman, reported on the desirability of having the coal and water supply in the hands of the locomotive department. From 21 replies received to inquiries, it appeared that only on two roads does the Superintendent of Motive Power have control of these departments. The committee believes that they should always be under the control of this department, which knows best what it wants. Economy may often be promoted by intelligent assigning of different kinds of coal to certain districts of the road, so that the draft appliances on the locomotives can be adapted to the coal furnished. Mr. Stretton, the English engineer, who is a member of this Association, tells the committee that in England water for locomotives is very generally filtered, and the water supply and fixtures are under the locomotive superintendent.

COAL CONSUMPTION.

A committee, of which Geo. H Brown was Chairman, reported on the manipulation of the throttle, cut-off and boiler feed as affecting the amount of coal consumed. The report begins by attacking the theory, which at one time was advocated by a very noisy crowd—that a locomotive should always be run with the throttle wide open, the speed being regulated by the reverse lever The committee believes that even to day not one engine in one hundred is so arranged that the engineman can follow this rule successfully. As to feeding the boiler, no engineer serves a road economically, however skillful in other respects, if he is not a good pumper. With the present large locomotives, the runner has ample opportunity to accumulate a reserve of hot water. Often a train may pull out of a station and proceed several miles upon its journey—this depending on the weight of the train, the speed and grades—before it is necessary to put additional water into the boiler. When pulling out of a station it is advisable not to force water into the boiler unless it be actually necessary. The observant and careful engineer will take every possible means to utilize the steam that would otherwise go to waste through the pop valves by using it in putting as much additional water into the boiler as it may carry without danger of working water over the steam valves. He will so regulate his water feed on approaching stations that when steam is shut off he will not be compelled to shut off feed water also, thus preventing loss of heat through steam wasted at safety valves. The careful engineer will not keep injector working when steam pressure is failing.

SMOKE.

The prevention of unnecessary smoke was reported upon by a committee of which D. R. McBain was Chairman. Circulars were sent out and 22 replies received. All were in favor of the straight stack and extension front; all in favor of the brick arch; 10 in favor of wetting coal; all believe that the smoke nuisance can be abated without the use of a "consumer." This report consists of an essay giving good advice to enginemen and firemen about firing. It recommends the wetting of coal when the weather will permit it. The baffle plate over the door is deemed of great value.

AIR BRAKING.

The longest report made at this meeting was on the art of air-braking, the Chairman of the committee being T. A. Hedendahl. The sub-titles are: Competency, Care of Engine and Tender Equipment, Lubrication, Air-Pump Heating, Draining, Handling Passenger Trains, Emergency, Handling Freight Trains, Economy of Air, Trains Partially Equipped, Use of Driver Brakes, Holding Trains on Heavy Grades, Feeding Leaks in Train Line, Kicking Off Brakes, Loss of Air Pressure, Two or More Engines, Stopping on Grade, Leaky Cylinder Packing, Le Chatelier Brake. We note some of the more salient paragraphs of the report. When testing brakes on a passenger train, before starting, a reduction of 20 lbs. should be made at once. It is not necessary to make this reduction in three or four installments. Brakes should be tested after the train is started, and has attained a speed of four to six miles an hour. When sand is used in making stops, great care should be taken that wheels do not slide before the sand begins to run. The committee strongly condemns the use of the emergency application at water tanks or any other ordinary stops. After an emergency application the valve should not be returned to the lap position, for brakes are seldom all in good condition and often are not all of the quick-acting type.

In handling freight trains, much more care is necessary, owing to the increased length, amount of slack, leakages, etc. More than two applications (not reductions) for a stop means a waste of air. When trains are partially equipped with air-brakes, the slack must be adjusted gently with a reduction of from 5 to 8 lbs., and a sufficient time allowed for slack to close up against the air-braked cars, before any further reduction is made, which fact can be easily discerned by any practical engineer, by noting the surging or crowding forward of train and engine, caused by the unbraked cars in rear forcing those at forward end ahead gently. When slack is all up, the secret of success lies in retaining it by not releasing the brake until the train is brought to a stop at the proper place. It requires less time, and causes less shock to cars at rear of train, when slack is drawn at a high than a low rate of speed, with an equal brake force in each case.

Hand brakes should not be used at rear end of partially equipped air-brake trains, unless all brakes in train are required to hold it. If hand-brakes are used, they should be used next to and immediately back of air-brake cars to hold slack of cars bunched, in case the air-brakes are released first. When a few air-brakes are used at front end and hand brakes at rear end of train, and the intermediate cars are not braked, it will cause severe shocks and break in-twos if air-brakes are released before hand brakes.

When stopping air-brake equipped freight trains the brakes should not be released before the train is stopped. The tilting of truck, due to brake-shoe friction, is not experienced on freight as on passenger cars, owing to brake beam being supported in different manner.

It is advisable to avoid releasing brakes, as far as possible, at a very low rate of speed: 1, because of the jerking; 2, owing to the uncertainty of applying brakes with sufficient gentleness to avoid shocks, or running beyond the desired point, which is largely due to inequality of train-line and auxiliary reservoir pressures, not having time to become equalized when reduction is made. It is better to let train come to a full stop before releasing, and then pull forward the short distance necessary, thereby giving more time for equalizing of pressures.

Driver brakes should always be used except on long grades where the Le Chatelier brake is used. In holding trains on heavy grades great care is necessary when making applications not to make them too harsh. If it requires 9½ lbs. of reduction to hold a train at a uniform speed, 10 lbs. must not be made, as the speed of the train will be too quickly reduced. If leaks exist which usually increase the brake force, due allowance must be made. It is good practice to run as long distance as possible after each recharging, thereby giving air pump more time to get up pressure, but this fact must not overbalance the amount of air consumed or lost in train line, as 20 lbs. reduction, or less, represents a full force application, and it cannot be considered safe to go beyond this amount before the speed is reduced for recharging. Take advantage

of curves in track and let-ups in grade for assistance. No specific time or distance can be prescribed as to how often brakes should be recharged, as conditions vary greatly with different trains. It is far better and safer to be governed by the amount of air lost or consumed, than by time or distance that train has run since last recharged, when determining how often brakes should be recharged. None of these advantageous points should be passed without recharging, if the slightest degree of doubt exists on the part of the engineer as to the safety of going to the next with a liberal amount of brake power in reserve with which to make a respectable stop in the event of an unexpected emergency. The question is sometimes asked, "What duration of time in seconds is required to recharge the brakes on a train?" or "How is an engineer to know when his brakes are fully recharged?" No specific length of time can be given. The conditions vary, such as size of main reservoirs and the amount of pressure, the number and length of cars in train, the general condition of feed ports in triple valve as to being perfectly clean or partially obstructed. The only successful method is to study closely the peculiarities of each individual case, when the first application is made and recharging becomes necessary; and at this time allow a liberal margin for safety, then govern yourself strictly by the air gage, which should be consulted at all times when charging and making applications of brakes. Some printed instructions in circulation relative to recharging brakes, read in substance, "When train line and auxiliary reservoir pressure become greatly reduced, and recharging becomes necessary, place engineer's valve at release or running position, and leave it there until black pointer on gage reaches 70 pounds, which will indicate auxiliary reservoir pressure." These instructions are somewhat misleading to a beginner on a heavy grade, as when the valve is placed at full release the main reservoir pressure quickly fills the train line, and at this time does not in any manner indicate the auxiliary pressures; therefore these instructions should read: When recharging on grade, place engineer's valve at full release position, and leave it so until both hands on air gage have fallen back and come to rest. Both hands falling denotes that main reservoir's pressure is flowing through train line to auxiliary reservoirs; hence the effective or auxiliary reservoir pressure cannot be determined until gage comes to rest (stops falling).

When the train line leaks, it is dangerous to try to overcome the difficulty by feeding air to it. Most experiments of this kind result in a runaway. Where a leak cannot be repaired, the engineer would do better to allow it to assist him in holding the train. Kicking off brakes should never be attempted. It is far better to release all brakes, taking advantage of the occasion to restore the air pressure and then catch the brakes up again.

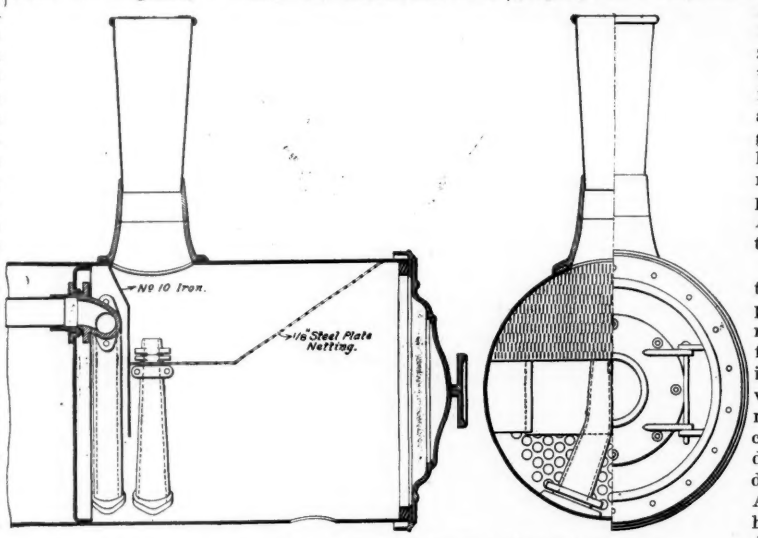
When an engineman descending a long grade finds that he has lost his air pressure, he must adopt the most heroic measures to bring his train under control; he should cast off the dangerous feeling that his reputation as an air-brake expert is at stake, and immediately call for hand-brakes. Loss of pressure often results from following the erroneous theory that some of the reserve power may be used up during the latter part of the descent; the only sound rule is to reach the foot of the grade with as much air pressure as you had when you started from the summit.

Where there are two or more engines on a train, the braking on a descending grade should always be done from the forward engine. The argument that the regular engineer could handle the train best because he has become accustomed to it is a very weak one, for it does not require more than one or two applications at most to learn the peculiarities of a case, and none, in fact, where brakes are kept in fairly uniform condition. On the other hand, no one knows that portion of the road so well as does the helping engineer, who is constantly going over it. Ordinarily the absolute control of the train should rest with the forward engineer both as to applying and recharging brake, but in some cases it is found desirable, in fact, necessary, to obtain some assistance from the other engines in recharging, which with proper intelligence may be done with absolute success by either resorting to a prearranged code of whistle signals for admitting air and also for cutting it off again when train is recharged; or perhaps a still safer method to adopt, where this practice is common, would be to attach an air gage to train pipe below the cut-off cock to engineer's brake valve, so that rear engineer may at all times see the pressure in train pipe, and thus be able to foresee the need of assistance in recharging and be prepared to render it. All engineers must recharge simultaneously, and they must also have the cut-off cock closed below engineer's brake valve on each engine, except the one upon which the brake is handled, before application is again made. The practice of recharging brakes from two or more engines is a refinement in air-brake practice that requires perfect knowledge of the requirements on the part of all concerned, and should not be attempted by any engineer who has not absolutely established his competency. In view of the possible mistakes and consequent results attending this practice, the committee believes that it is safer that engines working on heavy grades be equipped with air pumps and main reservoirs of sufficient capacity for all emergencies, and thereby obviate calling for assistance from the other engines.

The Le Chatelier brake is highly recommended by the committee; its construction and operation are simple; a small valve is fixed to the boiler, 6 in. to 12 in. below the water line and this is connected by a pipe ⅜ in. or ½ in. in diameter to the exhaust pipes in the cylinder saddle. To operate, first open cylinder cocks, then open valve in boiler slightly, and immediately reverse engine. Graduate the force of water on the pistons by changing the reverse lever and regulate the flow so as to have vapor escape from each cylinder cock, but not much out of stack. There is no danger of injury to cylinders and valves from its use, inasmuch as the conditions are the same as when engine is working steam, except possibly that the temperature in cylinder is somewhat lower. An eminent superintendent of motive power on one of our leading mountain lines reports that on helping engines on his road, working steam up grade and depending wholly upon the water brake down, the cylinders and valves run from 25 to 50 per cent. more miles than do those of road engines which are held down grade almost exclusively by train brakes, on the same division.

Standard "Front End" of the New Haven Railroad.

The illustration shows the standard smokebox of the New York, New Haven & Hartford Railroad. This road and its branches were among the first to adopt the extension front, and they have held it up to this time, although it has been dropped by many roads that have given it a serious trial. The purpose of the extension front was originally to collect the cinders, and it answered well so long as the engine was not forced. On heavy work, however, the front soon filled up, and the cinders went out of the stack, as usual, after being pulverized by the netting. On short runs and light trains the long front can be used as a cinder collector, but is no better for a spark arrester than the short front, as has been shown by a vast amount of experience.



Standard Front-End—New York, New Haven & Hartford Railroad.

The extension front shown by the illustration is interesting as the most successful and perhaps the simplest type used. The cinder pocket for taking out the cinders (not shown) is simple and easily operated. In the matter of draught with these front ends, the Master Mechanics' Association committee appointed to look into the subject reported that the draught was better with the short front. The same conclusion was reached by experimenters in France. The long front was tried in several countries in Europe and abandoned on account of interference with the draft and for other reasons.

Compression in Locomotive Cylinders.

No single factor in steam distribution in locomotives s so important and is so little understood as the compression of the steam at the end of the stroke. With valve motions of the Stevenson link type where there is considerable lead, compression is not necessary to take up the thump of the reciprocating parts, although perhaps it is better controlled by compression than by the "pre admission" of the steam due to the lead of the valve. "Pre-admission" is the entrance of steam ahead of the piston before it reaches the end of the stroke. It has been too commonly accepted that high compression is necessary to reduce the loss that would arise from the clearance spaces, in the steam passages, and at the end of the cylinder, if they were filled at each stroke from the boiler and exhausted into the air at the end of the stroke. Locomotive construction, in which simplicity is the prime consideration, practically compels a large clearance; that is, about eight per cent., whereas in the Corliss type of engine it is but two per cent. With the craze for high speed stationary engines a few years since, came the necessity for using much compression, and at that time a good many well-known engineers advanced arguments to show that compression was really no detriment, and the common statement was that the steam at the end of the stroke should be compressed by the piston up to the boiler pressure, or the pressure of steam in the steam chest. Many of these high speed stationary engines were introduced, and for a time they were more economical than the slower moving engines of the Corliss type, but improvements in the slow engines soon brought them to a point in efficiency where they were much more economical than the high speed engines. Now the tide has turned and for all work where great economy is desirable the slow-moving engine has the preference. The Corliss engine has been increased in speed from 60 to about 100 or 120 revolutions per minute. The high speed stationary engines are run from 300 to 400 revolutions. For a long time no really useful investigations were made as to the effect of compression on economy and up to this time little has been done that can be said to be of sufficient importance to point out any universal law. The experiments that have been made in technical schools and published in the *Proceedings* of the American Society of Mechanical Engineers are so limited in scope as to be of no great value. In some of the experiments the apparatus has been so bad in its plan as to give misleading results. The experiments now being conducted at Cornell University by Professor Carpenter indicate that the formerly accepted theories of the effect of compression on economy are wrong. So far as practical experiments go we have little or nothing to lean upon. In 1893 Prof. J. Burkitt Webb, of the Stevens Institute of Technology, read a paper before the American Association for the Advancement of Science at Milwaukee (See *Railroad Gazette*, Aug. 25, 1893), in which was outlined a plan for calculating the best theoretical point of compression. The plan is one that has been pointed out before, and assumes that the engine is a theoretical one, and in which there is little or no cylinder condensation. The proper point of compression, according to this plan is found when the area of the indicator card above a horizontal line drawn through the point to which the steam is compressed is equal to the area of the theoretical diagram which is lost by exhausting the steam to the atmosphere before it is fully expanded. That is, the area *A*, *B*, *C*, *K* should be equal to the area *D*, *E*, *F*, Fig. 1.

Those who have compared the water used per horse power as measured on locomotive indicator cards have frequently been disappointed in the results, for there are variations without apparent reason. That is, the similiar construction of the engines does not warrant such wide differences in the results. A close examination has, however, revealed that such differences are to a large extent due to differences in compression. Again, the use of inside clearance which reduces compression, has increased the efficiency of some locomotives in a remarkable degree, and to an extent that would not be warranted from a study of such writings as have been published on the effect of compression. To indicate what may be taken as the proper points of compression in a real practical engine having large clearances and cylindrical condensation, we have made a series of calculations, taking actual locomotive indicator cards with 15, 25 and 40 per cent. cut-off and 180 lbs. initial pressure. The indicator cards are shown in Fig. 2. It will be noticed that these are not theoretical cards, but are practical ones, showing wire drawing and back pressure. The basis of comparison of efficiency is the foot pounds of work per pound of steam; the mixture of steam at any cut-off being estimated from the results of the tests

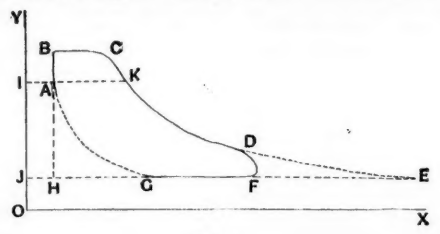


Fig 1.

made on the Purdue University Laboratory locomotive. The percentage of steam condensed up to cut-off at 40, 25 and 15 per cent. admission is 17, 21 and 25 per cent. respectively. The weight of steam at cut-off was calculated from the pressure shown on the cards, allowance being made for the condensation as just mentioned.

The weight of the steam in the clearance spaces has been estimated on the assumption that it is dry saturated steam, which is practically true for the purposes of this calculation. The difference between the steam present at cut-off and in the clearance space has been taken as the amount used per stroke. The ratio which has been taken as the measure of the efficiency is the foot pounds of the effective work per stroke, determined from the indicator card divided by the pounds of steam used per stroke including condensation.

The several compression lines shown indicate the points for which the calculations were made and the figures at the side of Fig. 2, indicate the pressure by gage. The tables give the results of the calculations.

It will be seen that the most economical point of compression, according to this method of calculation, is 70 lbs. for a 15 per cent. cut-off, 60 lbs. for 25 per cent. cut

off, and 50 lbs. for 40 per cent. cut-off. Professor Webb's method gives 110 lbs. for the 15 per cent. cut-off, 93 lbs. for the 25 per cent. cut-off, and 70 lbs. for the 40 per cent. cut-off. It should be understood that by both these methods of calculation it is indicated,—and is probably true, that steam should be compressed no higher than the figures given, and that increase of pressure above these amounts should be obtained by admitting steam from the steam chest.

Taking the case of the 15 per cent. cut-off, the compression up to 110 lbs., according to Professor Webb's

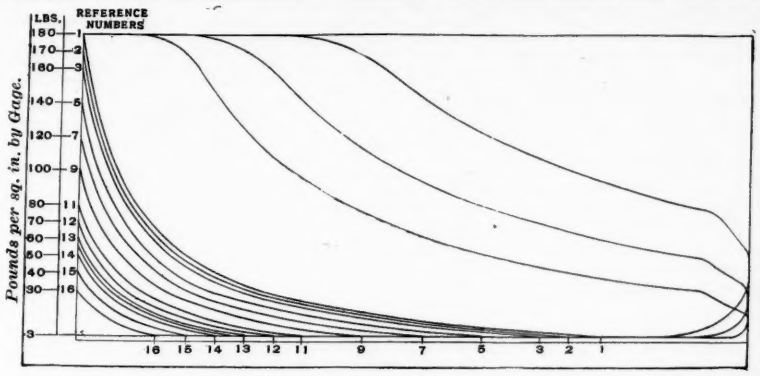


Fig. 2.

method, instead of 70 lbs., as indicated by these calculations, makes a very considerable difference in the area of the indicator card. If one should use the old rule and compress to the boiler pressure the loss would be considerable, as will be seen by examining Fig. 2, in the case of the 25 per cent. cut-off, which is the one more commonly used on locomotives. A compression to the boiler pressure would certainly cause a serious decrease in efficiency, while the use of 93 instead of 69 lbs., the two figures given by the two methods of calculation, shows a considerable difference in the power of the engine.

At a 40 per cent. cut-off the difference is less, as might be supposed. The tables give the necessary results to compare the efficiency of the engine with different points of compression. As an example, when we take the results from the calculations for a 25 per cent. cut-off, which is the one commonly used, to compress to the boiler pressure would give 604.9 foot-pounds of work per pound of steam, while to compress to 60 lbs.,—which gives the best efficiency,—would result in 646.5 foot-pounds. or a difference of 41.6, or about 7 per cent. The difference in efficiency between Professor Webb's results and the one outlined here is very small, which goes to show that the change in efficiency for small changes in the point of compression is not great, and the difference is less as the cut-off is increased.

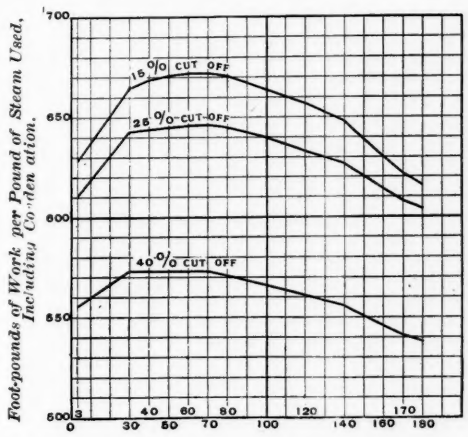

Foot-pounds of Work per Pound of Steam Used, Including Condensation.
700
650
600
550
500
15 % CUT OFF
25 % CUT OFF
40 % CUT OFF
0 30 50 70 100 140 160 180
3 40 60 80 120 170
Terminal Pressure of Compression by Gage, lbs. per sq. in.

Fig. 3.

As a general conclusion from this analysis, it is evident that the degree of compression is not such an important factor in efficiency as might be understood from much that has been written and said, and small charges make only small differences in efficiency, but the more important conclusion is, that where an engine, like a steam locomotive, is lacking in cylinder power it is in the line of economy and common sense to decrease the compression below what it ordinarily is. This can be done either by cutting out the inside lap or by increasing the lead of the valve. Figure 3 shows in a diagram the results from the calculations that are given in the table. These diagrams emphasize the small changes in efficiency that arise from rather wide differences in compression.

New England Roadmasters' Association.

The thirteenth annual convention of the New England Roadmasters' Association was held at the Revere House, Boston, on the 18th and 19th inst. The President, R. P. Collins, Old Colony Division, New York, New Haven & Hartford, in calling the convention to order, expressed his pleasure in being able to congratulate the Association on the fact that all the roads have experienced increased prosperity during the past year, and with the increased business they have been enabled to give the roadmasters more men and material for the work devolving upon them. The year has also been free from large casualties. The Association has lost only one member by death, Mr. W. F. Dearden, of the Grand Trunk. Mr. Collins congratulated the Association upon the fact that when a practical railroad man was wanted for an important position, the Governor had selected one of its members, and appointed Mr. Bishop, of the Fitchburg Railroad, one of the Railroad Commissioners, "and," he added, "we shall now always secure a fair hearing upon all matters coming before the Commissioners in which we are especially interested, something we have not always been able to obtain in the past."

The election of officers resulted as follows: President, A. C. Stickney, Boston & Maine; Vice-President, C. C. Elwell, New York, New Haven & Hartford; Secretary and Treasurer, M. C. Hamilton, New York, New Haven & Hartford. Executive Committee: W. C. Clark, Boston & Maine; E. H. Bryant, New York, New Haven & Hartford; C. B. Lentell, Boston & Albany; P. A. Eaton, Boston & Maine.

The rest of the forenoon session was occupied with the reading of the following reports:

FROGS AND SWITCHES.

How many frogs and switches shall call for an extra man in the section force?

The amount of traffic over the frogs and switches should determine to a very great extent the number of frogs and switches to each man in the force. We consider that fifteen frogs and switches would necessitate the employing of an extra man in the section force, as an average on the line of a railroad.

C. C. ELWELL, J. W. SHANKS, J. R. PATCH, Committee.

RAIL JOINTS.

Your committee have been confined to such joints as have been offered for trial, and have only to report on two—the Weber and the Continuous.

We consider, after careful investigation, that either is an improvement over ordinary joints heretofore in use, but that for all purposes of strength, simplicity and wearing quality and economy of maintenance in track, the Continuous joint is to be preferred.

As an advance toward better joints, we would suggest the advisability of having the rail ends mitre cut, instead of square, greatly diminishing the shock to wheels, and consequent wear both to rails and rolling stock.

A. C. STICKNEY, J. W. SHANKS, C. B. LENTELL, G. A. DENMORE, Committee.

TRACK TOOLS, ETC.

Track Tools.—Each section should be supplied with track tools in abundance and of the best quality and design. The adoption of standard track tools should be carefully made. The use of steel, instead of iron as formerly, should be carefully considered in order to effect as great a reduction in the weight of tools as possible without loss of strength. Tools thus reduced to their minimum in weight would not only cost less but would be much more easily and quickly handled by trackmen.

Your committee, instead of specifying any particular weight or design at this time, would recommend that a committee be appointed to secure samples of the different track tools with plan or print of the same, giving size and weights; to be presented at our next meeting for discussion and adoption, after possible modification.

Nutlocks.—We would recommend that nutlock which, in its form or shape, will not catch in the hole of the joint fastening when being used; will not rotate with the nut; will not injure the threads of the bolt or nut, and will retain its spring after nut is loosened; all being dependent upon the proper quality, hardening and tempering of the steel, or in other words a double spring nutlock as has proved to be superior.

Spikes.—We would recommend a spike made of mild steel, size $\frac{5}{8}$ x 5¼, with re-enforced throat, to insure greater longevity, and having a point with sharp cutting edges so as not to mutilate the fibers of the tie.

Bolts.—We would recommend a bolt of good quality mild steel, with threads so made on both bolt and nut that the nut can be screwed on by the fingers for the first three threads only; remaining threads to be turned by wrench, but loose enough to prevent bursting the nut; with cup head having oval neck that fits tightly the entire width of the hole of joint fastening; bolt ¾ in. diameter, nut 1⅝ in. square; with ideal nut for rails less than 4½ in. high, U. S. Standard rolled thread.

Braces.—Where tie plates are not used, we would recommend a brace made of malleable iron or soft steel, about 8 in. long, so made as to allow for reasonable shimming without pulling the spikes from the brace, and to fit perfectly against the under part of ball and neck of rail.

Tie Plates.—Your committee gave their recommendations at last year's meeting (see pages 94 and 95 of printed report of that meeting), which they cannot change, and which is made a part of this report for further discussion.

C. H. BRYANT, J. W. DREW, W. E. TUTTLE, Committee.

TIE PLATES.

Your committee on "Tie Plates: Under what conditions are the best results obtained from their use? Their value in keeping the track to gage and in preserving the tie," submit the following:

In the report of the Committee on Tie Plates, accepted last year by this association, their use was advocated under certain conditions, to which report the members are now referred.

In that discussion it was shown that the use of tie plates not only adds life to the tie, but is a saving of labor to the trackman. I believe the best results obtained from their use should be ranked in the following order:

1. At terminal yards, where, on account of frequent switching and the use of sand, the rail base cuts into the ties quickest and their renewal interferes most with the traffic, and where the least labor can be performed by truckmen.
2. At bridges, where the first cost of the ties and the expense of fitting them warrant the use of tie plates.
3. On sharp curves to save the uneven wear of the rail heads; to save the frequent adzing of ties, with loss of their thickness; to save the frequent re-spiking; to give correct gage and to keep the alignment of the curve, so as to prevent the oscillation that wears the rolling stock.
4. At switch runs on main line under those rails that cut into the long ties, requiring expensive renewal, while the tie is good under the other rails.
5. At joints, on tangents, to save the rail ends from crippling, especially in double track, where the blow of the wheel is in one direction.
6. On tangents, where the ties are cut out before they decay.

As regards the second clause of the question, would refer to the five benefits derived from the use of the tie plates as reported in last year's report, viz.:

1. The decreased annual outlay for ties through their greater longevity, and the correspondingly lessened cost of labor in replacements.
2. The lessened amount of labor necessary in maintenance, such as tamping, shimming, gaging and lining.
3. The preservation of angle bars and bolts, and the true surface of the rail.
4. The double resistance of lateral pressure.
5. The saving in power and wear to rolling stock through the above results.

E. H. BRYANT.

POSITION OF BRAND.

In a rail properly made there is no need of turning rails to have the brand either outside or inside when laid. Lay them as they come from the mill, having ties level, to give an even bearing for wheel tread on top of the rail.

We do not know of any rails rolled to-day but those designed to be alike on both sides of the head and base.

WM. E. CLARKE, M. E. DREW, Committee.

FROGS IN STOCK.

1. As each particular section of rail calls for frogs to match, it is advisable to have as few patterns of rail as possible on any one division.
2. Do away with half sizes and fractional numbers of frogs; for example, instead of having No. 8, 8½, 9, 9½, etc., have only No. 8, No. 9, etc.
3. Adopt a standard main line frog, and in all new construction and renewals use this standard, and thereby in time get rid of all odd sizes of main line frogs. Your committee recommend a No. 10 for main line standard.
4. Also adopt a standard yard frog, and in all new work and renewals use this standard; your committee recommend a No. 8 for yard standard.

Special frogs to be used only where standard frogs cannot be used, and your committee fully recognizes the fact that many times only special frogs can be used.

G. L. R. FRENCH, P. A. EATON, J. W. MCMANAMA, Committee.

The afternoon session was occupied with the discussion of the reports. The first one considered was that on "Frogs."

Mr. SHANKS (Central Vermont) said the only way to reach a conclusion in regard to the number of frogs which should call for an extra man is from actual experience. The number suggested by the committee was right.

Mr. COLLINS (Consolidated): The matter is of vital importance especially in the spring of the year. With some of us, in busy yards it seems sometimes almost impossible to keep the work up and the road in order, and it is absolutely necessary we should have extra men. The number named in the report is small enough.

Mr. PATCH (Connecticut River): Am allowed about half a man per mile. I have one section in Holyoke which consists of one mile of main track and 14 miles of side track. In that section there are 133 frogs and switches. I ought to have 12 men on that section, but have to do the work with nine men; it is too much work for the men, and it is gradually getting the best of me. Should prefer less than 15 frogs and switches for an extra man, especially in winter.

Mr. HASKELL (Boston & Albany): The idea on our road is to make the sections of unequal length so as to give each section foreman the same number of men and thus equalize the work. In some of our large yards, like that at Springfield, the section has only half a mile of main track. I agree with Mr. Patch that a less number of frogs and switches than 15 should necessitate an extra man.

Mr. OTIS (New York Central) believed that 15 frogs and switches in a large yard was altogether too large a figure for requiring an extra man.

Mr. CAFFERY (Lehigh Valley): This is a most difficult problem on account of the different conditions to be met. One yard with 50 frogs and switches may not begin to require as much work as another with half the number. Under some conditions one may allow frogs to get considerably worn while in another case it would not do.

Mr. BODWELL (Boston & Maine): Junction frogs at terminals will wear much more than the average turnout frog and will need much more care. I get an extra crew when needed.

Mr. HAMILTON (Consolidated): I think extra crews cost more than if the same number of men are divided up among the regular gangs.

The report on the best method of reducing the number of frogs carried in stock was next taken up, and Mr. Eaton, of the committee, said the idea was to have as few sizes as possible.

Mr. HAMILTON (Consolidated): By co-operation of the management, the roadmasters can systematize the number and sizes of frogs. No. 8 should be the shortest used in yard work; for cross-overs, where you want speed, 15 or 20 is short enough.

Mr. PATCH (Connecticut River): The first thing we ought to have is a standard rail. If I was a general manager I would have only two standard rails, one for main lines and one for branches, and I would have Nos. 6, 8, and 10 frogs only. Now we have 65, 68, 70, 72 and 75-pound rails and any number of frogs.

On motion of Mr. Hamilton it was voted to recommend Nos. 6, 8, 10 and 15 instead of Nos. 8 and 10 as recommended by the committee.

The third topic discussed was on

TURNING RAILS.

Mr. SHANKS (Central Verment): Have always turned one-half the rails I have laid. Way back in the history of rails there was a great difference, sometimes $\frac{1}{16}$ in. in the roll of the rail. There is not so much now, but still I think there is a difference. Rail mills claim the brand is on the outside of the rail.

Mr. EATON (Concord & Montreal): I have always until recently been particular in laying rails, but with the new 100-lb. rail there is no difference whatever.

Mr. STICKNEY (Boston & Maine): Had always turned the 75-lb. rails, but three or four years ago was told there was no difference in the rail and so did not bother about turning them, and had no trouble. Last year, however, I found there was a difference and that rails have a running side, and this year have turned half the rails I have laid.

Mr. PATCH (Connecticut River): Have been told by

three different mills that they always roll rails so as to have a running side.

Mr. OTIS (New York Central): Have never laid any rails yet without turning half of them.

Mr. Shanks moved as a substitute for the report of the committee a recommendation that rails should be laid so as to have the running side come on the inside. Adopted, and the meeting adjourned for the day.

At the Wednesday evening session Mr. C. C. Elwell, Roadmaster of the New York Division of the Consolidated, gave a very interesting address on methods of railroad construction in Europe. Mr. Elwell had the honor of being the only Roadmaster ever sent from this country as a delegate to the International Railway Congress, and his address showed the result of some of his personal investigations while abroad last summer.

ENGLISH RAILROADS.

From an interview with Chief Inspector John Hewitt, of the London & North Western Railway, many interesting points were gleaned. The organization of that road consists of a Chief Engineer, Assistant Chief Engineer, Divisional Engineer and Chief Inspector. Under the latter are four Sub-Inspectors, each having supervision over about 20 gangs. The foremen are called "gangers," and have an average of one man per mile of track during the entire year. The sections are called "ganger's lengths" or usually "lengths," and are 1½ miles long on four-track roads and 2½ miles on double-track roads, thus giving each ganger about four men. The ganger does the track walking on his length and works with the men the rest of the time. Trackmen are called "plate layers." The bridge department is seperate from the track department, and is in charge of inspectors who report to the Divisional Engineer.

Close attention is given to the drainage of the rodbed. The standard gage of 4 ft. 8½ in. is used and tracks are laid 6 ft. apart. The ballast is 6 in. deep under the ties on branches and 9 in. on main line, and is composed of: 1st, slag from the blast furnaces and costs about 25 cents per yard; 2d, crushed stone, costing about 62½ cents and screened to a size that will pass through a 2-in. ring; 3d, engine cinders, usually sifted so that nothing but the coarse material is put under the track; 4th, gravel, usually of rather poor quality. When any new track is to be constructed the roadbed is first graded according to standard section, ample drainage being provided for; then a temporary track is laid with old rails and sleepers, from which ballast is distributed and the temporary track is raised to grade. Then the material for new track is distributed and placed in position. They do no high-raising of new track. When relaying track all the ties, rails and ballast are removed and entire new material substituted. Ties that are fit for use again are separated from those that are to be used for fence posts or firewood. Ties or sleepers are of uniform size, viz., 6×10 in. ×9 ft., and are made of red pine and thoroughly creosoted. They are placed in the track waney side up and cost about 90 cents each. The ties are placed 3 ft. centers and have secured to them before being distributed from the train the cast-iron chairs in which rest the double or bull-headed rails universally used in England.

Metal ties do not meet with much favor in Great Britain. The new rails being used on the London & North Western weigh 90 lbs. per yard and are 60 ft. long and are fastened in the cast-iron chairs by compressed oak keys driven on the outside. The iron chairs weigh 45 lbs. each and are secured to the ties with galvanized iron wood screws and round iron spikes. Between the chair and tie there is a piece of tarred felt. They are not troubled much by creeping track where the rail is fastened in the chair with keys. There are a variety of fastenings for joints. The inspector said he prefers the plain fish plate.

Tamping is usually done with picks where only stone and slag is used. Gravel and cinders are tamped with what they call a "packer," which is something like our tamping bar. The lining of track on curves is done with the aid of a 33-ft. string. All Englishmen speak of curves as so many chains, meaning the number of chains in the radius of the curve. About the same elevation is given to the outer rail on curves as in the United States. Each foreman has a list of curves and the proper elevation furnished him. Each section has a very small tool house, but not too small for a fire-place. Many of these quarters are made in hillsides or are roofed with sod. No hand-cars are used in England, but they have a "leary," which is similar to our section truck. No foreign help is employed; the inspector informing the speaker that he only knew of one Irishman on the road and he worked only one day. The company provide no houses for its men as they prefer the cheap rents which they can usually find very near the work. The rent paid in the country runs from 50 cents to $1 per week, while in the town they pay from 83 cents to $1.12. In both cases the accommodations are very poor, in small stone or brick houses. I saw no wooden buildings in England.

The salary of the Chief Inspector is $16 per week; that of Sub-Inspectors is about $10 or $11; a good ganger gets from 75 cents to $1.25 per day; plate layers' wages varies from 60 cents to $1 per day; the best foremen for extra work get $1.50 per day, but there are very few who receive so much. Men are paid at the nearest station by the Station Agents. Each laborer is obliged to provide a shovel. The men work 56 hours per week, six of them being on Saturday; each man is entitled to and gets pay for three days' vacation each year.

The Inspector has five work trains on his division, each in charge of a ballast guard, which means with us work train conductor. Over the five trains is a ballast fore man who looks after all the gravel train work. Work trains are furnished by Division Superintendents and are subject to the inspector's orders. The inspector has a blacksmith, so does not have to trouble, or be troubled by, the machinery department. The frogs are similar to ours; switch points vary from 12 to 20 ft. long. The switch stands are made of cast iron. Extra gangs laying or relaying track, renewing ties, etc., consist of about 40 men.

Highway crossings are guarded by gates, which are usually handled by some section man's wife, who receives for her trouble ⅛ crown (62½ cents) per week. These gates are so constructed that no one can get on the right of way without climbing over. No one is allowed to walk on the right of way unless accompanied by a railway man. Hedge fences are used almost universally throughout Great Britain; they are kept neatly trimmed, as are the weeds and grass on the company's right of way. Section men take care of station platforms, cleaning off snow, etc. On this road no snow plows have ever been used. The track tools are about the same as are in use here. Rail joints on roads in England are laid opposite. They use iron shims for surfacing tracks in winter. The cast-iron chairs are seldom broken except by too hard hammering on the wooden keys.

Gradient posts are put up wherever there is a change of grade. This is universal both in England and on the Continent. The four tracks of the London & Northwestern are operated as two double-track parallel roads; fast trains run on one side and freight on the other.

The inspector and sub inspectors wear uniforms, and the company furnishes a hat, top-coat and mackintosh for each.

Thursday morning the consideration of the reports was resumed. Mr. Clark, of the Committee on Rails, asked permission to give some reasons why the committee reported as it did. He then read letters from the Cambria Iron Works, that all their rails have both sides rolled alike; from the Troy Steel Works, to the effect that while they are not rolling any rails at present, they understand that all rails are supposed to be alike on both sides; and from the Pennsylvania Steel Company, that it thinks it makes no difference how the rails are laid.

The subject of rail-joints was then taken up.

RAIL JOINTS.

Mr. CLARK (Boston & Maine): I believe in the advisability of having the rail ends cut miter; we are way behind in having square joints.

Mr. CAFFERY (Lehigh Valley): Our company had its rails cut miter for several years, but this year has suddenly stopped. I think the change is only temporary, however, and that miter cut rails will be resumed soon. The reason for the change was because during the six years they have been in use two or three hundred have been broken at the ends—most of them in less than a year's use. I do not think the break was due to the miter, but was caused by a defect in the rail or in making the joint. They were laid in angle bar joints. The base did not break in any case, but only the head to where the web joined. Only one end of the rail broke.

After a little more debate the subject was referred back to the same committee to report next year.

The report of the Committee on Track Tools, Nutlocks, Spikes, etc., was adopted.

The last session was held Thursday afternoon, when the report on tie plates was adopted and the committee discharged.

It was voted to hold the next convention in Boston on the third Wednesday in August, 1896, and after adopting resolutions on the death of Mr. Dearden of the Grand Trunk, the convention adjourned.

Thursday evening there was a banquet at the Revere House, nearly 100 ladies and gentlemen being present. An orchestra furnished music during the evening and the post prandial exercises consisted of short speeches by Messrs. Collins, Elwell, Davidson, Clark, Shanks, Caffery, Otis, Brady, French, Hamilton, Goulding, Ellis, Mrs. Elwell and Railroad Commissioner Bishop.

Friday morning, by invitation of Mr. Sanborn, Superintendent of the Plymouth division of the Old Colony system of the New York, New Haven & Hartford Railroad, the members of the Association, ladies and a number of supply men boarded a special train of three cars for a visit to certain interesting points on the line of the road. The extensive granite quarries at Quincy were first visited, the road winding up to the highest point on the division, at one place a 36 degree curve and a 2 per cent. grade being combined. Next a call was made at Brockton, where a great work is in progress in separating the grades by elevating the tracks for some three miles, thus getting rid of more than a dozen grade crossings. The special then proceeded to Plymouth, where carriages were in waiting for a drive round the town. Nantasket was next visited and a ride on the electric railroad proved one of the most enjoyable features of the entire trip. An idea of the abilities of the road was given when the seven miles between Pemberton and Nastasket Junction were covered in 10 minutes, and in one instance a mile was run at the rate of 67 miles an hour. Boston was reached on the return at 5:30 p. m. Superintendent Sanborn accompanied the party on the trip and Superintendent French, of the Cape Division, was also present part of the time. A bountiful lunch was served on the train and everything possible was done for the enjoyment of all.

EXHIBITS.

Avery Stamping Co., Cleveland, O., Fox pressed steel tie plate, pressed steel snow shovel and pressed steel fence post.

Continuous Rail Join Co., Newark, N. J., section of track showing continuous rail joint.

Diamond State Iron Co., Wilmington, Del., Churchill rail joint, Hall spike and samples of angle bars.

Dilworth, Porter & Co., Pittsburgh, the Goldie tie plate and Goldie spike.

Eureka Nut Lock Co., Pittsburgh, samples of Eureka nut locks.

Eyeless Tool Co., New York, the Eyeless steel picks.

Fairbanks, Morse & Co., Chicago, the Barrett track jack, Sheffield pressed steel hand-car wheel and also a model of hand-car.

Wm. Goldie, Jr., & Co., Pittsburgh, Pa., exhibit the perfect tie plug.

Iron City Tool Works, Pittsburgh, standard track tools, claw bar, R. M. A. standard bars, tamping pick, I. C. perfect track chisel, spike mauls, sledges, etc.

National Lock Washer Co., Newark, N. J., exhibits the well-known National lock washer and nut lock.

A. O. Norton, Boston Mass., exhibits the sure drop track Jack which was described in the *Railroad Gazette* of Sept. 13.

Niles Rail Joint Co., Chicago, exhibits a section of rail showing application of joint.

Pennsylvania Steel Co., Steelton, exhibits the Company's automatic safety switch stand for unbroken main rail, adjustable guard rail clamp and the Acme steel rail brace.

Page Woven Wire Fence Co., Adrian, Mich., exhibits a section of its well-known fence.

Q. & C. Company, Chicago, shows samples of the Servis tie plate.

Ramapo Iron Company, Hillburn, N. Y., photographs and working model of switch stands, etc.

Ruffner & Son, Philadelphia, samples of the Excelsior nut lock and fish plate springs.

Standard Equipment Co., New York, samples of the C. A. C. tie plate.

American Washer & Mfg. Co., Newark, N. J., samples of the Harvey ribbed washer and other nut locks.

Sheehy Automatic Railroad Signal Co., Boston, working model of an electric block signal.

Verona Tool Works, Pittsburgh, exhibit a lot of track jacks, track gages, tools and samples of the well-known Verona nut lock.

Wharton Railroad Switch Co., Jenkingtown, Pa., exhibits an automatic switch stand.

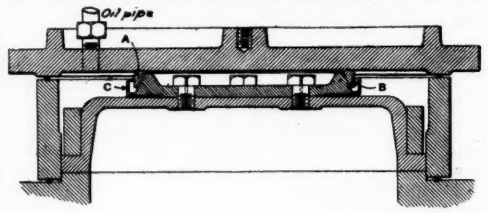
Weber Rail Joint Co., New York, exhibits a section of rail showing application of the Weber Rail Joint.

Young Lock Nut Co., New York, samples of the Young gravity lock nut.

Burnham & Duggan Railway Appliance Co., Boston, Mass., exhibit the Duggan rail chair.

The American Balance Slide Valve.

In this valve a circular balance strip is used instead of the four balance strips forming a rectangle as is the common practice. The two different methods of applying this balance are shown in Fig. 1 and Fig. 2. The balance shown in Fig. 1 is applied when there is enough clearance inside the steam chest at full travel of the valve to



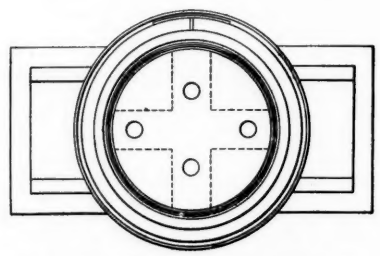
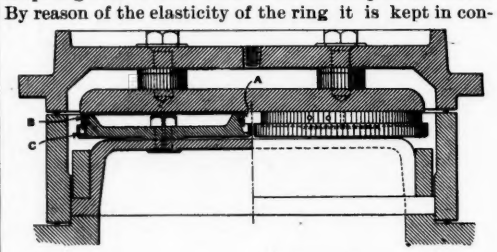


Fig. 1.—American Balance Slide Valve.

permit the circular strip to overhang the sides of the valve, and in case there is not enough room, two balances are used, as in Fig. 2.

By reference to the illustrations it will be seen that the balance strip consists of a beveled snap ring *A*, which is sprung over a cone carried on the top of the valve. By reason of the elasticity of the ring it is kept in con-



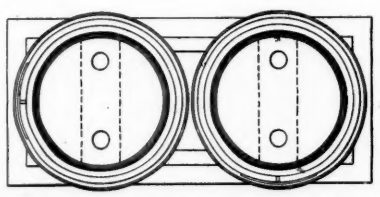


Fig. 2.—American Balance Slide Valve.

tact with the plate on the top of the steam chest. To prevent a leakage of steam through the cut in the ring a strip *B* is fastened to the ring and extends far enough across the cut so as always to cover it. This ring is turned slightly smaller in diameter than is required in its working position, so that when the steam chest cover

is placed in position the ring is forced down a little, and exerts a pressure on the bearing plate. The pressure against the bearing plate is not dependent, however, on the elasticity of the ring, but is increased by the effect of the steam pressure on the outside of the ring, which, owing to the beveled face of the ring, tends to decrease its diameter and force it up against the bearing plate. Owing to the wearing of the ring being entirely on its upper surface, it will continue to press against the bearing plate, even when considerably worn, due to the fact of the difference in diameters of the ring and cone. When a locomotive is running without steam, the partial vacuum formed will relieve the tension on the ring Should a breakage of the ring occur the pieces are prevented from falling down on the valve seat by the shape of the lower part of the cone, *C*.

This balance can be applied to the valve of almost any locomotive. The piece on which the cones are turned is bolted to the top of the valve after the yoke is put in position. Small holes are drilled through these bolts to connect the space above the valve with the exhaust. In case the top of the steam chest is of such a shape as not to permit the balance ring to rub against it, a bearing plate is interposed, as in Fig. 2.

These rings are made of cast iron and the strip *B* is of the same metal, fastened to the ring by counter sunk screws. The area balanced with one large ring is the area of one steam port, two bridges and one exhaust port plus five per cent. In the case of two rings 10 per cent. is added instead of five.

This balance is patented and manufactured by the American Balance Slide Valve Company of Jersey Shore, Pa. It is in use on 63 railroads in the United States, Mexico, Canada, and in Europe.

American Railroading and "the Foreigner."

At the dinner of the Western Railway Club, described elsewhere, Col. Haines spoke on the London meeting of the Railroad Congress. We give a few extracts from his speech.

I have come 1,000 miles to be with you here to-night, more from my desire to meet the gentlemen who have made the Western Railway Club a success than with the idea that what I may have to say about the International Railway Congress is worth coming so far to tell. Before the recent meeting but little interest had been taken in it by American railrord officials. Mr. Ely of the Pennsylvania railroad and a few others had attended some of the previous meetings, and when it was decided to meet this year in London they aroused sufficient interest among some other companies to induce them also to become members and to pave the way for the American Railway Association to be represented by its president, secretary and six other delegates.

I wish that I could dwell upon the impressions made upon my mind during my month's stay in this metropolis of the world. And well may it be so called, for you will see there in the vicinity of the Bank of London other institutions, such as the Bank of Yokohama, of Singapore, of Australia, of the Argentine Republic, etc., representing financial relations with all parts of the world, and I was told that there were then on deposit there over $2,000,000,000, the surplus income of British capitalists awaiting profitable investment. It made my mouth water to think of what could be accomplished with such a fund in our country. But no! for the moment, South Africa, with its gold and diamond mines, attracts their attention, to the exclusion of less brilliant investments.

The sessions of the congress were held in the Imperial Institute, where our little band of twenty to thirty Americans was lost in an assemblage of 700 or more Frenchmen, Belgians, Italians, Austrians and Russians, with a few Germans and an occasional Spaniard, Portuguese, Japanese and Turks.

But there was a sufficient number of stalwart, cheery Britons to make us feel at home, and their hospitality was as hearty as it were magnificent. We were provided with credentials which opened to us the doors of every railroad office, signal station and shop, and which also served as passes for ourselves and families throughout Great Britain (including the underground railways in London) and over most of Europe.

There is one point upon which I wish to lay particular stress, and that is the evident lack of appreciation among European railway officials of the merits of American methods. This was brought out forcibly in the discussions in the section termed light railways.

They feel over there that even in those thickly populated countries there are still extensive areas insufficiently provided with railroad facilities because the present traffic will not justify the cost o construction and operation in accordance with their recognized standards, and it was evident that those interested looked to the congress for an expression of opinion as to the feasibility of relaxing those restrictions for the encouragement of such projects. Here seemed to be the opportunity for the application of American experience. Yet, while the information offered by the American delegates was received with respect, it made no impression as bearing on their own necessities.

This was the great lesson that we learned by our presence at the congress, that the majority of the influential railroad engineers and managers of Europe are not favorably impressed with American practice. They recognize that a few of our trunk lines have approached the perfection which they have attained in Europe, but as to nine-tenth of our mileage, they look upon it as what they term "light railways," hardly suitable for feeders for their principal lines.

Now, is there not food for thought in this statement? Is there not among European railroad experts a field for some missionary work in behalf of the American system? I may be answered that it is no concern of ours to enlighten our European cousins as to how they should construct and manage their railroads.

But there is another view to be taken of this matter; one which is of great importance to American engineers, to American manufacturers of railway material and to holders of American railway securities, and to which I call your serious attention.

Within the past 30 years there have been more miles of railway built in this country than the total mileage of Europe to-day. With the aid afforded by that mileage the population of our country has, in the meantime, nearly doubled and its exports have trebled. Yet all this has been accomplished by methods which, in the eyes of European railway managers, are substantially inadmissible, even with feeders for their main lines.

Before I attended the London meeting I might have thought that while this was rather mortifying to our pride, yet it was a matter of no great interest to us. But I do not now. It is not enough for us to say, let the Europeans manage their railroads their way, and we will manage ours in our way. It might be, if there were no roads to be built anywhere else, but the blessings of civilization are yet to be spread over two-thirds of the globe, and on what system shall the railways be built that are to carry them? The European system is intended to provide improved facilities for existing traffic; the American system to provide facilities for creating the traffic itself; and this is the work that is to be done in South America, Africa, Asia and Australia, while the money to do it with is to be provided from the surplus fund lying idle in London and in the other great money centers of Europe. Wherever this work is done on the European system, American methods, American railroad men and American railway materials are barred. Is it then of no concern to us to enlighten our European professional brethren as to what the American railway system really is? Of its greater adaptability to the needs of a new country than that with which they are familiar? and how can this be better done than by inviting them to come here and see for themselves the great work that the American system has accomplished?

The next regular meeting of the International Railway Congress is to be held in Paris during the exposition of 1900, but from our conversation with the delegates at the London meeting I think it probable that if an invitation were extended to the permanent administration to hold a special meeting here in advance of that meeting it would be favorably entertained. The work of such a meeting should be confined to the study of American practice, and I feel sure that there would be a good attendance of those prominently identified with railway construction in the regions to which I have referred. This is especially true of the Russians whom I met, who were desirous that such a meeting should be held in this country.

It is unnecessary for me to enlarge upon the value to our railroad men and manufacturers of railway material of bringing these gentlemen here to see for themselves that our methods are not only suited to the needs of a new country, but also to the growing necessities of a prosperous people and to see their results in the creation of trunk lines which will compare favorably in condition and efficiency with any European lines.

If the European delegates to such a meeting could be convinced of the truth of these assertions and would give them their official endorsement, it would go a long way not only to remove the opposition to the introduction of American methods into South America, Africa, Asia and Australia, but also to remove, in a great degree, the doubts which prevail in the minds of European capitalists as to the intrinsic value of American railroad property.

This then is the great lesson to be drawn from the London meeting of the International Railway Congress: that it is of importance to American railroad men and manufacturers of railway material, as well as to the holders of American railway securities, that the European mind should be enlightened as to American railway practice and its suitability for opening up the vast regions to which European capital is now being attracted and that this should be done by holding a meeting of the International Railway Congress within the next two or three years in advance of the Paris meeting of 1900. For the information which would be gathered by the European delegates at the meeting here would be applied by them in the interim, and the results of their experience would be duly set forth in the official proceedings of the Paris meeting, thus bringing the matter before the Eueopean world in a most impressive and convincing way.

New York Street Railway Association.

The thirteenth annual meeting of the Street Railway Association of the State of New York was held in Albany, Tuesday, Sept. 17, President G. Tracy Rogers, of Binghamton, presiding. We make the following extracts from his address:

The result of the year's experience shows a demand for better roadbeds and overhead construction, heavier rails, more ties, better ballasting, lighter motors, better machines, and more conservative financiering.

The fact that electric traction is being considered by steam railroad people makes it a subject of general interest. They may adopt electricity on some of their suburban lines to protect their local travel, which we have taken from them whenever and wherever we have gone after it, but the results cannot materially affect the interests of street railways. We carry our patrons to their door-steps, the public streets are our depots; we have no expensive stations to maintain; our traffic is more certain, less affected by business depressions and more capable of development than that of the steam railroad. These are advantages that the steam railroads are unable to overcome, and, together with the paralleling of steam railroads by electric railways, have forced a number of railroad companies into purchasing electric lines, and there is evidence of increased activity in that direction.

We now have in this State about fourteen hundred miles of track and an investment of upwards of two hundred millions of dollars. We carry every year seven times the population of the entire United States, and over one-third the population of the entire world—over five hundred millions of passengers annually—while the steam roads carry but one hundred and sixty millions. The gross receipts of this street railroad traffic are about twenty-five millions of dollars.

The cost incident upon the change from animal power to cable or electric was staggering to the investor. The large electric companies came to the rescue in many instances, after gathering statistics of operations and increased receipts caused by the adoption of rapid transit and ascertaining the ability to earn more than enough to pay the interest on the cost of the change. Such information unfortunately invited speculating capitalists, who, in many instances, took advantage of the additional profit.

Over-capitalization, which has been prevalent in years past, is gradually disappearing by reason of foreclosure of mortgages and a general desire for conservatism on the part of financial people interested. In a growing city with a sound franchise, reasonable capitalization, and a well-installed system for which too much has not been paid, the securities should and do commend themselves to the conservative investor.

The present demand is for a lighter motor and a flexible suspension of the motor to avoid pounding of the joints. I believe this can be obtained, and am pleased to learn that some of the companies are working in this direction. There is still work for the inventor. The extension of our roads into the country, and the connection of a number of roads to form a large system brings up the question of potential and feeders. We may look for some valuable experiments in the use of the alternating current on street railway lines. This, in my opinion, is one of the most, if not the most, important and interesting subjects that confronts us at the present time.

Many attempts have been made to produce power from compressed air, acids, and numerous other agencies, but as yet none have been able to compete with electricity in economy and efficiency. However, we are ready to accept any innovation the ever-busy inventor may produce by which we can reduce the cost of operation.

Mr. W. W. Cole, of Elmira, read a paper entitled, Are We Laying Too Many Miles of Track to Reach a Few People? We abstract the following from it: In locating track if you stop one block short of the line between the settled district and the open field the people will walk that one block to the cars. The saving on say 1,500 ft. of track in a year will be about $3.68 per day, allow-15 minutes headway, 9 cents per car mile and interest at 5 per cent. on $26,864. Extending beyond the line of population extends many lines beyond the line of dividend. In building new lines we must educate the people to their use and further must educate them to build on the open territory developed, and to move into the houses built. By keeping within the lines of existing population we can extend in the direction of the movement of population and thus make no mistakes. A railroad extended into open territory will enhance the value of real estate, but while it is being built up the road is losing money by wearing out rolling stock and track. A sufficient bonus should be given to carry the road until the territory supports it. Generally the rolling stock must be replaced by the time the fields become populated and the track must also be repaired, meaning practically a new road to suit the new conditions.

A city of 40,000 inhabitants with 20 miles of track has, say five city lines extending 2,112 ft. beyond the settled territory, that is, two miles of track with but little traffic. The average riding per capita in cities of 40,000 is 46 times per year. This would give $92,000 gross receipts, leaving $27,600 receipts if operated at 70 per cent. The average road is bonded at the rate of $30,000 per mile, which is $600,000 for 20 miles. Interest at 5 per cent. would be $30,000, leaving a deficit of $2,400 due to the two miles of track built to promote the extension of the city. Had 18 miles been built and bonded for $540,-000, giving $27,000 annual interest, $600 surplus would have resulted, which could undoubtedly be increased to pay the stockholders a fair rate of interest. When extension becomes necessary the promoting energy should be devoted to one line, no others being extended until this is self-supporting. Precaution must be observed in running suburban lines to parks and pleasure resorts where travel continues for about three months only. On the other hand, parks and pleasure resorts built along existing lines, even at considerable expense, will help the road largely if properly managed. If possible they should be located on lines connecting two towns, promoting traffic in both directions and obviating an empty return mileage.

Mr. H. S. Newton, of Syracuse, read a paper on Economical Equipment and Operation of Power Houses, from which we take the following: Mr. Newton called the attention of the Association to details of economical equipment and operation, which ordinarily do not get beyond the engine room, although they might often be profitably considered in the office. He thought that a modern electric street railroad station should best be a compound condensing station. He then described one of this sort recently built by the Syracuse Street Railroad Co., which consists of three double compound engines of the upright marine type with 16½×31 in. cylinders and 24 in. stroke belted direct to 300 K. W. multipolar generators. These engines exhaust steam into an independent surface condenser, the condensed steam being pumped through an oil filter into a hot well, from which the boiler feed pumps convey it through a pipe heater to the boilers. No more than 10 per cent. of the boiler feed water is taken from the outside water-supply, thus obviating difficulty from scale. Five 90×16 in. return tubular boilers with 118 4-in. tubes comprise the boiler plant. These are fed through 2½-in. pipe by two pumps, one acting as a relay to the other. The plant has been in operation for a few months only, which has made accurate tests as to its economy impossible as yet. The coal and water bills and the absence of repairs have demonstrated that power is being made at a low rate. Two objections so far have been noticed. First, it was not deemed necessary to cover the pipes carrying warm water to the boilers, resulting in a loss of about 10 deg. between the heater and the boiler. The second objection, since remedied, is the absence from the water line of a check valve beyond the pumps to relieve those at the boilers. This has the advantage of prolonging the life of the valves and obviating the rattle in these valves occasioned by the pulsations of the pumps.

Since pumps have a decided tendency to get out of order, Mr. Newton advises the use of an injector on each boiler.

The poor quality of water around Syracuse and the presence of a mixture of oil and dark brown sediments in the boilers resulted in the use of the surface condenser and the re-utilization of the condensed steam. This was after using a large variety of so-called boiler-cleaning compounds. The accumulation noticed resulted from using too much cylinder oil, also oil of the wrong kind, and insufficient filtration of the oil from the feed water before going to the boiler. The first was remedied by regulating the amount of oil used, the second by changing the kind of oil used, a mineral oil being found the most satisfactory, giving never more than a slight film apparent in the boilers at the weekly cleaning, which rapidly succumbs to the action of a half pail of soda ash pumped in with the feed water before cooling off. The third trouble was remedied by using a better oil filter.

Experiments made to determine the most economical fuel showed anthracite buckwheat, costing on board cars at the power station $2.25 a gross ton, to be the most economical. It was first tried mixed with an equal amount of soft coal, but this necessitated extra help for mixing and was not so economically fired. Thirteen tons of buckwheat are now used as against 17 or 18 of the mixture. Experience with special devices, such as high and low water alarms, automatic damper regulators, etc., has shown them to be of the greatest value.

The vertical marine type engine has given good service, although it is noisy. To avoid subjecting the vertical crosshead to too serious wear, compression was lowered beyond the point usually employed. This results in more noise, but obviates hot crossheads and guides. Piston valves for the high pressure cylinders and grid-iron slide valves for the low pressure are found to act about as well as Corliss valves. Regarding governing, Mr. Newton takes a station with generators compounded for a constant potential of 500 volts with constant engine speed and a feeder system allowing for an average loss on the line of 10 per cent. with a full load on the machine. With the engines governing perfectly 10 per cent. is lost in transmission. When slowed down under load so that the dynamo showed only 450 volts this becomes 12 per cent., and with 400 volts, 15 per cent. This shows the importance of governing prime movers. Mr. Newton concludes by advising high class employees and showing the inadvisibility of employing cheap men. The discussion upon this paper brought out the fact that upon one line of the company above named, which has an 8 per cent. grade on a curve, about 38 cars are run to 13 tons of coal consumed. The plant is operated at 116 lbs. pressure. Mr. Cahoon finds Eureka Clearfield coal the best with 116 lbs. pressure and compound condensing engines. This costs $2 per ton. He also finds that the cost of power delivered to the line per kilowatt hour as derived from several stations in the West is about 1⅛ cents, this, the cheapest, being found at Toledo.

A paper was then read by Mr. Benjamin Norton, of Newburgh, entitled: Is Freight or Mail Service Profitable or Unprofitable on Street Railways? We make some extracts as follows: In the case of a street railroad which has no suburban outlet and no direct or close connection with some other line which operates, or can conveniently operate, a freight service, it might be a very unprofitable adventure to undertake this class of traffic. Very few electric roads have thus far branched out into this field. Experience of a line which has gone extensively into work of this character shows it to be such a successful feature of their business that a regularly organized and paying freight department is in existence and the work is regulated as on a steam road. The line was an old horse railroad in the city of Newburgh, which when rebuilt electrically and extended tapped the rich Walkill valley at Walden, 12 miles away, and terminated at one of the largest cutlery works of this country. The line gives an opportunity to Orange County dairymen to get their products to the river at Newburgh inside of an hour, avoiding heavy and expensive teaming. The road now handles at low rates dry goods and other merchandise for Walden, coming from New York by boat to Newburgh; also raw material for the cutlery works one way and manufactured material the other; also condensed milk in cans from the Borden Works two miles from Walden, and bales of hay, straw, etc., from farms along the line.

During August the road was operated at 40 per cent. Three motor freight cars carrying from 8 to 12 tons each and 4 flat cars as trailers carrying from 6 to 8 tons each were run. The terminus at Newburgh renders transference of freight to boats very easy, also to the Erie and the West Shore freight houses, insuring an all-year connection with New York, although the boats generally stop only one month in the year.

Regarding mail contracts, although compensation is small, the actual cost to a company is so little that they must be profitable to a certain extent. By utilizing part of the mail cars for regular passengers in time of strikes their passage can be insured by the United States mail signs and money earned from the passengers carried. This makes the contract for carrying the mails of great value, it often being the case that only the mail cars can be operated. At such times it will prove very profitable, as was found during the great strikes in Brooklyn last winter, when one particular line operating 19 mail cars was kept open during the entire trouble.

In reply to a question concerning collection of freight without interfering with passenger traffic, Mr. Norton said that with four minutes' headway trouble would be experienced, but that with cars running once an hour, as in the case of the Newburgh road, ample time is given. Freight is collected at a general freight house in Walden, where most of it is delivered. The freight trains run on regular schedule, but some freight is collected along the line. Concerning freight to be delivered at intermediate points and the expense of so delivering it, Mr. Norton said that the majority of their freight was through freight. In the case of a line in Norristown in 1888, difficulty was experienced in delivering packages at various points along the line, causing annoying delays. The successful plan is to move a majority of of through freight or else deliver it at certain points arranged for the purpose.

Mr. Cole said that in Utica during strikes the mail sign was carried on all the cars whether there was mail on the car or not, the system being authorized to carry mail. Concerning the system in operation in Brooklyn, Mr. Norton said that they had two cars arranged like regular railway post offices on the long line to Coney Island. These reach the general post office by a side track, where the mail is put into the cars, being sorted and distributed on the cars en route and delivered at the various stations.

Mr. J. F. McElroy, of Albany, then read a paper on Car Heating by Electricity. We make a few extracts from it.

The general principle employed in the construction of electric heaters is that of placing in these heaters suitable resistances, which resistances become heated by the passage of the electric current. High temperature is one of the conditions which lead to the destruction of the resisting conductor. This difficulty arises from the fact that oxygen of the air will attack metals more strongly when a high temperature is maintained in the metals. Another cause of the destruction of resisting conductors lies in their crystallization at high temperature. This is a difficulty to which German silver or any alloy of different metals is especially liable. The reduction of temperature in the resisting conductor may be carried to any extent desired by simply increasing the amount of actual surface in the resisting conductor, its temperature thus being reduced to a point where the conductor is absolutely safe and its life is permanent.

Mr. McElroy here gave an interesting description of the electric heater made by the Consolidated Car Heating Co., of Albany.

It is important in the construction of electric heating devices that the expansion of the metallic wire due to change of temperature be fully provided for, and that the heater be so arranged that under no circumstances can the force of expansion and contraction create a strain upon the resisting conductor or upon the insulating parts which would be liable to injure or to break them. This is especially important in conductors designed to be run at a high temperature as the difference in length of the conductors at the extremes of temperature to which it is subjected is quite a considerable part of its length.

It is a well-known principle that a wire of a given length, if heated and then cooled, and again heated and cooled, is not the same length at the same temperature that it was in the first test. Changes will go on for some time in lengths of wire so subjected to heating and to cooling, and the fact should be considered in the construction of electric heaters.

The proportion of electric energy transformed into heat in a conductor depends upon the resistance of the conductor. The electric heater is the only case that comes within our knowledge where 100 units of electric energy may be transformed into 100 units of any other one form of force. We can then establish the heat equivalent of the electric current for all electric heaters in which no disintegration takes place in the resisting conductors, one British thermal unit (one pound degree F.) being produced by 1,047 watts of electric energy.

Practical experience in the heating of cars has demonstrated that it requires about 20,000 British thermal units per hour to properly heat an 18-foot car in the latitude of New York State in the coldest weather, which amount of heat should be provided as a maximum. The average requirement during the months of winter when heat is used would not exceed one-half of this amount, or would be, approximately, 10,000 British thermal units per hour.

The amount of heat required, however, differs somewhat according to the construction of cars, to the number of passengers carried, to the exposure to winds on the lines where they are run, and to the care exercised by conductors in closing the doors promptly when passengers enter or leave the cars.

The heat given out by 52 persons will maintain the same temperature in the car as it is required on the average during the winter months. This point has a practical bearing in the heating of cars.

The cost of operating electric heaters will depend upon the kind of engine employed and the cost of coal. If coal costs $2 a ton, and if the average consumption of current in cold weather is seven amperes, and if we take a compound low-speed condensing engine as the average type of engine in point of economy in consumption of fuel, we will find that seven amperes for one hour will cost 1.17 cents.

From the reports received the average length of time a car is in service per day in the winter is 15 hours. The cost of operating electric heaters with the average consumption of current in cold weather would, therefore, be 17.55 cents for 15 hours. This cost does not allow for any depreciation in heaters, as the three years of service of the heaters here considered does not appear to have any effect upon the life of the conductors. The cost of heating by coal stoves Mr. McElroy finds to be about 19¼ cents per car per day.

Mr. C. Loomis Allen, of Syracuse, read a paper on General Track Construction. In treating the subject Mr. Allen said the evolution of track construction for electric service has been exceedingly rapid when compared with the time which steam roads have taken to reach their present point of excellency. Some street roads can now show permanent way equalled by but few steam roads. Light girder and T rails have given way to heavy deep girder and T rail sections. Only recently, and after a costly experience, has much attention been given to the foundations or to the condition of the sub-grade. Economy in track maintenance begins with the making of firm foundations. Mr. Allen enumerates the difficulties in laying permanent way through city streets such as excavation without interrupting traffic, the difficulties with sewers, water pipes, gas mains, electric conduits, etc., settling and disturbed ground, etc. It often results in making good the poor work of municipal authorities. Mr. Allen suggested that railroad companies should co-operate with city officials in placing in specifications for underground structures, clauses pertaining to the proper filling of trenches. The question of backing has never been given the amount of attention that it deserves. Stress is laid upon the subject of proper drainage of the sub grade. Eight inches of broken stone ballast under the ties after the track has been surfaced and tamped is specified and 120 lineal inches of ties in width is recommended to each 30 ft. rail. Rails for street use should weigh not less than 85 lbs. to a section 7 in. deep, or less than 95 lbs. to a section 9 in. deep. Width for base and head are 5¾ in. × 2½ in. respectively. Most of the standard sections rolled are good, but there are differences in opinion regarding the value of girder rails with the L-head or the half grooved head. Rails of the latter type from the Johnson Company have proven exceedingly well finished and make a smooth riding track, but are opposed by some because of the danger of the groove clogging with ice and snow during winter. The record of this rail in Buffalo disproves this. Fish plates or channel bars should be at least 32 in. in length, and if for a 9 in. rail should be punched for 12 one-inch bolts. Mr. Allen recommends the corrugated plate manufactured by the Johnson Company, but any properly made joint should not give way sooner than the rail itself. Combination brace-plates are recommended and not tie rods, many disadvantages of the latter being enumerated. Spaces between rail ends are not recommended in whatever weather the track may be laid. Single bonds with large contact with the rail and 0000-connecting wire are recommended in place of double bonds of smaller size.

The last paper read was that by Mr. J. H. Barnard, the subject being Signals on Electric Railroads. We make an abstract of this paper. With the advent of mechanical power in the field of street railroads came a consequent change in the management in service. While striving for good service, perfection in this direction can never be reached. Even a high character of service requires the unceasing efforts of all the executive force.

Electric or mechanical signals are too limited in their range for street railroad work, consequently the telephone is an instrument that can best replace the telegraph lines in the hands of our class of employees. Over a two-mile telephone line any conductor or motorman can report a trouble from as many stations as are desirable and prompt messages for relief be sent to him at once. This communicates from outlying points to the office, where there is always some one to notice the call bell. Signals from the office to arrest the attention of passing employees, however, are more difficult to arrange. This, while desirable on a double track, is even more needed on a single track road. The requisite is that from any station it may be possible to call and instruct the men at such points as the particular need demands without calling and so detaining the men at other points. In this way also, supposing stations to be located at each turnout, a man at any one of them can communicate with another at the next turnout, which is of the greatest importance in preventing cars from getting out of phase or in getting them in again. Mr. Barnard recommends stopping a car which may be behind time and letting it fall back upon the schedule of the car following it, thus delaying the passengers in the one car, but causing no delay throughout the system.

The following officers were elected for the ensuing year: President, G. Tracy Rogers, of Binghamton; First Vice-President, W. W. Cole, of Elmira; Second Vice-President, John H. Moffit, of Syracuse; Secretary and Treasurer, Benjamin Frick, of Brooklyn. Executive Committee: H. H. Vreeland, New York; John W. McNamara, of Albany, and Henry M. Watson, of Buffalo. The meeting then adjourned.

The Transfer of New England.

The New Haven correspondent of the New York *Evening Post* has contributed to that journal a well-informed article on the change of ownership of the New England road, from which we make some extracts.

While manifest railroad destiny has long pointed to the absorption of the New England system by the New Haven Company, events of the last 18 months have forced the result much more rapidly than was foreseen or expected. The unlooked-for success of the reorganization scheme, and the prompt payments of the assessments, changed the situation suddenly. They forecast the rehabilitation of the road as a more active competitor than

ever, and with it the danger, still more serious, that a strong company, like the New York Central, might take it as a Bos on connection. In the strained relations of the New Haven and New York Central companies owing to the new freight traffic arrangements of the former, by which freight from the West was "looped" around the Central, this fear had much to justify it.

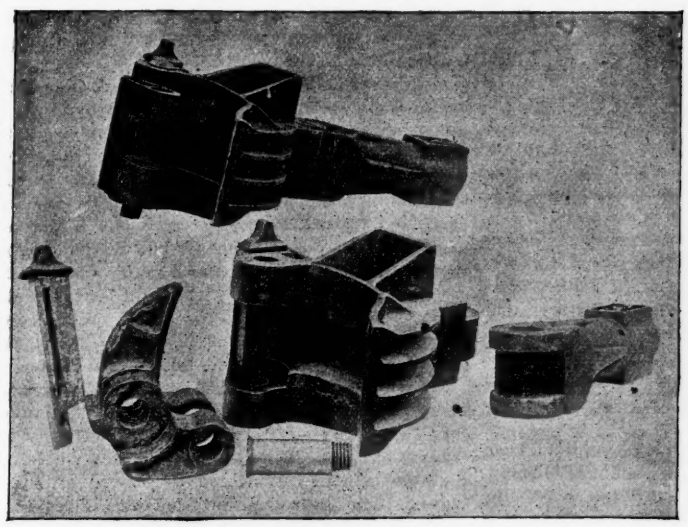
The advantage to the New Haven Company of acquiring the New England property may be summarized as (1) the end of competitive rates at some 20 junction and terminal points in southern New England, including such places as Boston, Providence, Worcester, Springfield, Woonsocket, Willimantic, Norwich, Hartford, New Britain, Waterbury, Meriden and Danbury; (2) the end of the competition at important points near junctions by which the New England has taken the long haul while forcing the short haul on its competitor; (3) the acquisition of the valuable New England terminal at Boston; (4) the amount to be saved in fixed charges by refunding of bonds falling due within 10 years, the lowest possible estimate of this single economy being $500,000 a year; (5) economy of joint operation under the merger, especially at junction points: (6) saving in legal cost from long and bitter controversies in legislation, especially in Connecticut; (7) the acquisition of the reorganization fund, an advantage, however, more apparent than real, as it has had to be paid for in the rise of the purchased stock; (8) the elimination of the Norwich boat line as a possible disturbing factor in through traffic, and (9). most important of all, the removal of the sharp menace from the New England under the possible control of a powerful outside company.

To this long list of gains there are serious offsets. The New England Road is still in bad condition, and public sentiment will exact from it under New Haven control a far different state of affairs from that tolerated so long as the managers of the system could plead poverty. This is particularly the case in the matter of grade-crossings, the New England Company being far in arrears under the Connecticut law. Undoubtedly also the New Haven Company must assume several New England branch-line leases which could be dropped to its profit. The New England is a crooked cross country line east and west, cutting the prevailing course of the valleys, with steep grades and sharp curves, and very badly situated for economical operation. It is negatively rather than positively valuable to the New Haven Company, and the latter can afford to take it only on competitive grounds. Last spring, as is known, the New Haven managers made a very careful examination of the property, and the decision to take it was arrived at after figures had been reached which showed a gain, largely by non-competition, stated at the time on high authority as $900,000 a year, to be made by the transaction.

With the control of the New England the New Haven Company becomes all but absolutely, railroad master of southern New England and of the whole through system of boat lines on the Sound—in which important changes are foreshadowed, including the probable abolition of the Stonington line of steamers. In Connecticut there are now left outside of its control only the New London Northern, the Philadelphia, Reading & New England, and one short line of a semi-private character. On a basis of mileage, not single track, the new absorption in effect divides New England railroads among five corporations nearly as follows: Boston & Maine, 2,762 miles; New York, New Haven & Hartford, 1,991 miles, Fitchburg, 450 miles; Boston & Albany, 389 miles, and the Vermont Central, 772 miles, the five systems thus including all but about 600 miles in the six New England states.

The La Rue Flexible Coupler.

The essential feature of the LaRue coupler, which is illustrated in the accompanying engraving, is the hinged joint in the shank at the back of the head. The object of this is to enable cars to be coupled when they are standing on sharp curves, and also to avoid the strains that are put on rigid couplers when rounding such curves, especially when the overhang of the cars is different. It will be seen that this joint allows the head to



The La Rue Flexible Coupler.

swing laterally with the motion of the end of the car and thus adjust itself to the proper position for remaining in contact and yet not bring any undue strain upon the parts. The locking device is clearly shown by the pin and knuckle and the pin in the drawhead in the engraving. The pin catches against the shoulder on the knuckle when in its lowest position and releases the knuckle when it is raised, allowing the heel to pass through the notch cut in the bottom of the pin.

As the contour and the design of the knuckle and head do not differ materially from other couplers that are already on the market, and that are rendering satisfactory service, so far as strength is concerned, the interest in this one centers on the hinged joint at the back, for it is necessary that no weakness should be developed at this point.

The coupler has been subjected to the M. C. B. tests at Altoona, with the result that in the drop, guard-arm and jerk tests the "flexible joint was uninjured and could be operated after each test had been finished," to quote from the committee's report. At the third blow of the drop test it was found that coupler had passed the limit of opening allowed for the knuckle, but that the fault lay in the bending of the pin and not in any defect of the coupler.

The heads of the couplers that were tested were made of malleable iron by the Troy Malleable Iron Co., of Troy, N. Y., and the steel knuckles by the Penn Steel Co., of Chester, Pa. The coupler is being placed on the market by Mr. A. LaRue, of Danville, Pa.

The Deep Waterways Convention.

The first annual convention of the International Deep Waterways Association was opened in Cleveland on the afternoon of Tuesday, the 24th. At the time of going to press we have no report of any proceedings later than Tuesday. General Edward C. O'Brien, of New York, President of the Dock Commission, was temporary chairman, and in his speech said that he regarded this as the most important public gathering assembled in this country in the last 25 years. He believed that an adequate waterway, uniting the lakes and the sea, would do more than any other one thing to bring increased prosperity. The speaker prudently confined himself to generalities. The Mayor of Cleveland delivered an address of welcome, to which Mr. E. V. Smalley responded: and in the course of his remarks predicted that ships would sometime sail from Lake Erie direct to European ports. The President, Sir Oliver A. Howland, delivered his annual address in the evening.

The provisional programme of the meeting covers the following list of topics:

1. International comity and co-operation (President's annual address).
2. Progress of the deep-waterway movement (Executive Secretary's report).
3. Economics of deep-water transportation.
4. Ultimate effect of deep water from the great lakes to the sea: On (a) the iron, (b) the coal, (c) the lumber, (d) the grain and flour, and (e) the cattle and meat business; (f) shipbuilding, (g) great lakes and ocean carrying trade, (h) railway traffic and earnings, (i) lakeboard and seaboard cities, (j) agricultural interests, (k) domestic iron mining, (l) iron and steel manufacturing.
5. Volume and value of commerce tributary to an enlarged waterway system.
6. Cost, character and utility of existing great lakes, Champlain and St. Lawrence improvements.
7. Control of the outflows and levels of the great lakes system.
8. Free or toll canals.
9. High sea regulations on the great lakes.
10. Effect of deep waterways on marine architecture.
11. Pneumatic and hydraulic locks.
12. Modern methods of excavation.
13. Is a type of vessel to navigate fresh and salt water practicable?
14. Comparative study of modern ship canals.
15. Government policy as to home and foreign canals.
16. Basis for international co-operation in canal construction and management.
17. Ultimate development of interior water transportation.

The list of papers, advance copies of which are so far received, is:

New York and Deep Water to the Great Lakes, by Thomas Curtis Clarke, Esq.; Volume and Value of Commerce Tributary to an Enlarged Waterway System, by James Fisher, Esq., of Winnepeg; Necessities and Advantages of a Ship Canal to the Ocean, by D. B. Smith, Esq., Secretary, Toledo Produce Exchange; Sectionalism and Railways versus Deep Waterways, by Prof. L. N. Haupt; Is a Type of Vessel to Navigate Salt and Fresh Water Practicable? by Joseph R. Oldham, Esq., of Cleveland; Regulation of Lake Levels with Reference to the Improving Waterways, by George Y. Wisner, Esq., of Detroit; Regulating Levels of the Great Lakes, by Thomas T. Johnston, Esq., Chicago; Modern Methods of Canal Excavation, by Isham Randolph, Esq., Chief Engineer Chicago Sanitary & Ship Canal Pneumatic and Hydraulic Locks, by Mr. Chauncey N. Dutton, of Washington; Comparative Study of Modern Ship Canals, by Mr. Charles Francis, of Davenport, Ia.; Effect of Deep Water on Domestic Shipbuilding, by Mr. George Tunnell, of Albert Lee, Minn; Effect on Railway Traffic and Profits, by Mr. Emery R. Johnson, University of Pennsylvania; Effects in Developing Iron and Mineral Resources, by Prof. Charles R. Vanhise, University of Wisconsin; Effect on Grain and Flour Business, by Mr. L. R. Heard Miller, West Superior, Wis.; Effect on Export Lumber and Timber Trade, by Mr. Richard R. Dobel, exporter, Quebec; Effect on Domestic Iron Mining, by Martin Patterson, Esq., mine owner, Superior, Wis.; Effect on Iron and Steel Manufacturing, by A. J. Moxham, President Johnson Steel Co., Lorain, O.; Relation of Glacial Deposits to Canal Routes, by Rev. G. Frederick Wright, D. D., Oberlin, O.

MR. CLARKE'S PAPER.

Of Mr. Clarke's paper we shall give the conclusions first.

Ship canals on the Canadian and Lake Champlain routes are not needed either from a commercial or a military point of view.

The enlargement of the whole Erie Canal into a ship canal would be very expensive and of less commercial value than the Oswego and Niagara Falls route.

Public opinion should concentrate itself upon the following things:

First—Immediate improvement of the Erie and Oswego Canals, upon which a vote is soon to be taken

Second—Construction of a ship canal not less than 25 ft. deep around the Falls of Niagara.

Third—Surveying the Oswego and Albany route to see if such a canal can be built within practicable limits of cost.

From Chicago to New York by the Erie Canal and the Lakes is 1,373 miles, of which 350 is artificial navigation. From Chicago to Montreal is 1,263 miles, of which 70 is artificial navigation. In 1893, grain was carried to Montreal at an average rate of 5⅝ cents per bushel and to New York at an average rate by lake of 6¼ cents. Notwithstanding the higher cost by the Erie Canal route its tonnage in 1893 was 4,275,662 tons, that of the Welland Canal route 1,294,823 tons, of which only 663,156 tons went to Montreal. The reason why so much less freight goes to Montreal is because the greater part is intended for domestic consumption and New York is a better market than Montreal.

If a ship canal be built it should be deep. The Suez Canal is 27 ft. deep, and the ships which pass through seldom have more than 2 ft. of water under their keels, and their best speed is 4½ miles an hour. A ship canal between the lakes and the ocean should provide for a vessel like the new steamer Victory, 380 ft. long and 48 ft. beam, and carrying on 20 ft. draft 7,000 net tons or 233,000 bushels of grain. The bottom width of the canal should be 150 ft., and the depth not less than 25. Mr. Clarke estimates that this vessel in such a canal with 5 or 6 feet of water under her keel should make 7 miles an hour, and the time of locking should not exceed half an hour. In a ship canal of less dimensions than these transportation will cost more than through a canal 9 ft deep, including cost of transferring.

There is but one route for such a ship canal. This would be by the way of Oswego, Lake Ontario, a 25-ft. canal 26 miles long being built around Niagara Falls. Possibly Oneida Lake, 25 miles long, would form part of the route; then the easterly part of the Erie Canal could be enlarged. This canal would have to be fed from Lake Erie. The cost of this would be a very great sum indeed. It would require turning the Mohawk River and its narrow valley into a series of lakes, moving the New York Central and West Shore railroads, besides many dams, factories and villages. Mr. Clarke judiciously adds that careful surveys should be made to ascertain the cost of such a project.

An improvement of the Erie Canal, so as to give it a uniform depth of 9 ft., and an enlargement of 32 of the locks, would permit fleets of five barges each to go from Cleveland to New York in six or seven days. Better organization would reduce the time spent in port so that nine trips could be made in a season. With 7½ ft. draft 1,500 tons could be carried and the effect would be to greatly leesen the cost of transportation.

A considerable part of Mr. Clarke's paper is an attempt to estimate the cost of transportation by various routes. In an appendix he has analyzed and grouped the elements of cost. These estimates for transportation of grain from Chicago to New York by various routes are as follows:

No. 1. Steamers Chicago to Buffalo loaded to 18 ft., carrying 6,000 tons, 1¼ cents per bushel.

Continuing on Erie Canal 7 ft. deep, total Chicago to New York 4.73 cents.

No. 2. Large steamers as in No. 1, transferring cargo to fleets, one tug and five steel barges, Erie Canal, 9 ft. deep, total cost Chicago to New York 2⅝ cents.

No. 3. Steamers of 7,000 tons loaded to 20 ft., Chicago to Oswego through Niagara Falls ship canal, 25 ft. deep; transfer at Oswego to 9 ft. canal, total cost 3 cents.

No. 4. Steamers as in No. 3 and Erie Ship Canal, 25 ft. deep, total cost 2.35 cents. The rate as figured out per ton mile is less than the cost of conveying freight on long sea voyages in vessels of 28-ft. draft.

No. 5. Steamer loaded to 18 ft., 6,000 tons burden, Chicago to New York, through improved Welland, St. Lawrence and Champlain canals, 20 ft. deep, total cost 3 cents per bushel.

No. 6. Erie Canal, enlarged to 18 ft.; large steamers, 5,000 tons, on 16 ft. draft, cost per bushel 6 cents.

No. 7, Erie Canal, deepened to 9 ft., fleets of one tug boat and four steel barges, total cost, Chicago to New York, 2 cents a bushel.

Foreign Railroad Note.

The Jaffa & Jerusalem Railroad had 4,920 first-class and 59,182 second-class passengers in 1894, against 4,600 and 64,821 in 1893. The reduction in the second-class is attributed to government restrictions on the immigration of Jews. The tourist and pilgrim traffic increased, in spite of cholera quarantine in the summer, and during the first four months of this year it was extraordinarily large. The freight traffic is reported as "satisfactory," but it amounted to only 16,870 tons, or about nine or ten of the big trainloads that sometimes come in on our trunk lines. This was nearly one-half more than the year before, but it is noted that it did not bring in a corresponding increase in revenue, because it was necessary to reduce the rates, to prevent the diversion of the greater part of the package freight to pack mules and camels. Nine-tenths of the freight was from Jaffa to Jerusalem—up hill. Jerusalem affords little out freight; but by laying a pipe line thence to the Jordan, the railroad might perhaps get a good back freight in Jordan water. The station in Jaffa is not near the harbor, but the company is about to extend its line to the water and establish a station there, with docks of its own, which will give it an advantage over the mules and camels which it does not now possess. It will also, doubtless, be a relief to the tourists, who will be delivered from the tender mercies of the donkey-drivers when they land.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisement-.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The reader will notice in the report of the discussion at the meeting of the Roadmasters' Association of New England, which will be found on another page, that several of the speakers recommended turning the rails so that the brand should always be either on the inside or the outside of the rails when placed in track, and a substitute for the committee's report was adopted to the effect that rails should be so laid as to have the "running side" inside. The only reason given is that rails as delivered have one "running side." Doubtless it is a convenience to always have the brands either on the inside or the outside, so that an inspector can see them as he walks the track. The other reason we should suppose would generally be purely fanciful. In times past it was not uncommon for a rail head to be a little unsymmetrical; a little higher or fuller on one side than on the other. Even now this defect is sometimes found, but not so often. But it is a defect and not intentional. No mill intends to send out rails with a "running side," and no mill does so if the inspection is as strict as it ought to be. Both sides are theoretically running sides and in rails properly made are so. The defect comes from rolls improperly designed or improperly turned. If two consecutive rails are so laid that the scant side of one rail butts against the full side of the other a rough track will result, *if* the defect is great enough. But this defect will always be on the upper side or the lower of the rails as they pass through the rails, depending on which roll is defective. Therefore, if the rails are laid in the track so that the brand is always on the same side, in any given line of rails, the full sides of the rail heads will follow each other in line, and that is all that there is in the idea of a "running side." If a road is so unfortunate as to get rails from bad rolls they had better be turned; but it is better and generally cheaper in the end not to get such rails. Competent inspection at the mills will insure two running sides to every rail.

The Trunk Line presidents met in New York last week, in pursuance of the plan to strengthen their association, which was outlined in our issues of July 26 and Aug. 2, but we cannot see that they have made any progress. On the contrary, the rumors about disagreements on one point and another indicate that the difficulties usually encountered in making traffic agreements without a pool have not grown any smaller by the lapse of time. The very same old questions that have always come up in the past come up now. The principal feature of the agreement, of a radical nature, that makes it different from former agreements, is the proposal to bind every member for a period of five years, but all the boards of directors have got to vote upon that before it will hold water, and the gossips are already saying that one or two boards have voted against it. The nature, amount and method of the penalty for violation of the agreement will be equally troublesome. This and other knotty points were referred to a committee of eight, headed by Mr. H. J. Hayden, and this reference is the only fact about the meeting that is authoritatively given out. The committee has sat three or four days already, but has made no report. As has been many times observed, the one thing needful to keep rates steady is the *disposition* on the part of all the presidents to personally see that they are so kept; and as rates for the last month or two have been much steadier than before for a very long time, it is evident that this disposition is now practically universal. If the mere discussion of a reform project produces such happy results, what may we not expect when it shall finally be consummated and burst forth upon the world!

As we write these words the deep waterways convention at Cleveland has only fairly begun and it is yet too early to say what the outcome of it will be. We fear, however, that there is little hope of practical suggestion. An overwhelming majority of the gentlemen who meet there and who will read and talk there go for the purpose of booming a ship canal from the lakes to the sea. Now, a ship canal proper—that is, a ship canal from the lakes to the Atlantic deep enough and wide enough to float safely and at reasonable speed a class of ships big enough and fast enough to keep the sea in face of competition—such a ship canal is a dream, a delusion, financially and commercially impossible under present conditions. We must regard it as an interesting theoretical study—nothing more. So far this agitation has done little harm, but now there seems a danger that it may do much harm. It may stop useful improvements, possibly attainable, on the Erie Canal, and leave the people with neither a ship canal nor a competent canal-boat canal. This is the only danger that seems imminent. There is little chance that New York State or the nation will be lightly or soon committed to the hundreds of millions that the ship canal would cost.

Notes of Fast Trains.

The weight given in our article last week for the New York Central fast train was wrong; the amount named, 565,000 lbs., includes the weight of the engine and tender, the cars weighing only 361,000 lbs. We carelessly copied the erroneous statement of the New York Central circular, that this was a "train of four cars, weight 565,000 lbs." The reader of the parallel columns will have detected the error, but those who read only the general statement should note that the cars of the Central weighed 2.4 times as much as those of the English train and not 3.76 times, as we stated.

In a press dispatch from Cape May, N. J., this week Mr. Ely, of the Pennsylvania, speaking of the best railroad speeds of the world, refers to the West Coast record of Aug. 22, as faster than that of the New York Central of Sept. 11. He uses official figures which he has received, and, deducting 12 minutes for stops, makes the rate of speed, while in motion, from London to Aberdeen, 64.8 miles an hour, which is .87 mile an hour faster than appeared from the record published by us last week, made up from the data sent to us by Mr. Pattinson. It will be observed that Mr. Ely allows for stops five minutes more than appeared in our record; and as there was only one stop for which we made no allowance, that at the Aberdeen ticket platform, the whole of this five minutes must be allowed at that point. As nothing closer than an even minute is used in the record, however, it will have to be assumed that considerable differences in the records of different observers are likely to be found at any or all of the stops.

Mr. Ely says that the fastest time ever made for five miles is 102 miles an hour, and that this record was made on the Baltimore & Potomac (a Pennsylvania line) Aug. 3 last. This run was made by a regular train from Landover to Anacostia, D. C., 5.1 miles in 3 minutes. This run was reported in the newspapers at the time and we made inquiry of the officers of the road, but did not succeed in getting the report confirmed.

On Sept. 8 the London & North Western ran a train from London to Carlisle, 299¼ miles, without stopping. In this case the London & North Western, like the New York Central, made up a special train, taking no passengers, and it was run on Sunday, so as to be free from interference. The engine was the "Ionic," similar to the "Queen Empress," shown at the World's Fair in 1893, but of an earlier type. It was fitted with large oil cups, and, according to *Transport*, from which we take these facts, arrived at Carlisle as cool as a cucumber. The rate of speed through was 51 miles an hour, no attempt being made to run at the highest possible speed. The train consisted of 7 cars, each 42 ft. long, and the weight of the seven is given as 336,000 lbs.

On Tuesday of this week (Sept. 24) the New York Central ran a special train from New York to Syracuse for the New York *Times*, to carry papers to the Democratic State Convention, which made 146.34 miles in 2 h. 10 min. 41 sec., equal to 67.19 miles an hour. The record is given as follows:

	Miles.	Time.	M. p. h.
New York to Albany	142.8	.....	.....
Albany to Syracuse	147.84	2 h. 14 m. 30 s.	65.96
Albany to Syracuse tunnel, where speed is reduced	146.34	2 h. 10 m. 41 s.	67.19

The engine was No. 939, and there were two cars, which had no lading, except the Timeses, with their epoch-making political leaders. The longest distance for which we find any previous record equal to this is 80.38 miles (Syracuse to Rochester), where the Empire State express made 68.45 miles an hour, on May 19, 1892.

Notes on Electricity and the Railroads.

Many persons find pleasure in speculating as to the high speeds that may be made by the use of electricity on railroads. Now, for instance, it is said that 60 miles an hour, made by the Baltimore & Ohio tunnel locomotive, shows the possibilty of high speed from electric motors. It ought to be well understood, after all that has been written, that high speed is practically independent of the character of the motive power. Last week the New York Central made an average speed of 64¼ miles an hour from New York City to Buffalo without at any time reaching a dangerous speed for a steam locomotive on a straight track, and at no time exceeding a speed that can be maintained by the best steam locomotives when the trains are light and the grades reasonable. An average speed of 60 miles an hour would carry the traveler from New York to Chicago in about 16 hours, and to maintain 60 miles an hour requires only moderately fast running. It does, however, require a clear right of way, reasonable grades and curves and prompt work by employees. The steam locomotive will maintain this speed if the conditions are right; electricity could do no more.

If the public wants very high speed it must pay for it. That the public does not want it at a fair price was indicated by the failure of the "Exposition Flyer" to earn the direct and indirect costs of its operation This result in a year when so many people traveled between New York and Chicago is quite enough to discourage railroad corporations from attempting very high average speed over long distance.

The important fact is that speeds for which the public is willing to pay a fair price can be made with a steam locomotive. It cannot be expected that faster trains can be run without increased cost, whatever the power used, and except in cases where competition is very severe, or there is some indirect advantage to be gained, railroads will not undertake to materially decrease the time between stations. It is a commercial question.

Sooner or later, some enterprising capitalist with a speculative turn of mind will build an elevated road for a short distance between points where traffic is heavy. When such a road is constructed with a practically straight track, without grade crossings, there will be no difficulty in running at an average speed of 100 miles an hour or more. Grades will not much matter, as sufficient power can be drawn from the central station to surmount them.

Sixty miles an hour for the Baltimore & Ohio tunnel engine is low speed; there is no reason why, with the motors arranged in multiple, the drivers should not revolve with great rapidity. They are much larger than those used on vehicles that travel daily at a speed of 60 miles an hour, and as there are no reciprocating parts, and further, as the electric motor is more efficient at high speeds, it is not beyond reason to expect that the Baltimore & Ohio tunnel engine could make a speed of 100 miles an hour, without the least difficulty, so far as the engine itself is concerned. Whether the current could be collected for such speed is yet a matter of conjecture; most engineers think it can be done.

We may sum up thus: The steam locomotive can give a faster service than travelers are willing to pay for; and, in general, transportation by electricity will not cost any less. There are special cases where very high speeds with electric motors may be introduced, but no such project outlined up to this time seems reasonable or feasible, and those who enter upon it may expect to lose their money.

It is reported that the Grand Trunk Tunnel under the St. Clair River will be worked by electricity, but those who are in position to know tell us that this is not a fact, for the reason that there is no demand for a change from the steam locomotives now being used. The air in the tunnel is no worse than in other tunnels, and the gas from the locomotives is not destroying the iron lining to the extent that has been claimed. It is understood that before the great expense of electric equipment is undertaken, some important attempts will be made to ventilate the tunnel with a fan. The experience so far in Baltimore points to the conclusion that unless there is a decided change in the method of op-

eration of that tunnel a fan would give far better results in ventilation than will be obtained from the electric motors, mainly for the reason that the freight trains go through the tunnel slowly and emit large volumes of gas and smoke, and although hauled by electric locomotives (the steam locomotive being hauled through not using steam) yet they foul the tunnel more than the passenger trains which are hauled by steam.

It is reported that there has been a decided increase in traffic since the electric motors were substituted for steam on the Nantasket Beach Railroad. Electricity has had all the credit for this, but if the same number of trains had been run and the same prices charged as formerly with steam locomotives it is a question whether there would have been any increase in traffic except that which naturally comes from curiosity during the first few months (or weeks) of operation The decrease of fare to five cents, and a large increase in the number of trains and a great improvement in the roadbed are the three things that have led to an increase of traffic. If such a reduction in fare was made between New York and Philadelphia, for instance, no one would question for a moment that there would be an enormous increase in traffic. It is the old story of rates and facilities; the relation of the motive power to the result is quite indirect.

Some of the problems that come up when a serious railroad management takes up the question of using electric power are well illustrated in the situation which faces a Western road at this moment. A new branch 40 miles long is to be built. It runs between two important cities, with several intermediate towns. These towns have no trolley system, and communication between them is difficult. To equip the road in the usual way, with steam locomotives, with an ordinary number of trains as run on such branches and with the ordinary rates of fare, would bring out a volume of traffic that can be pretty well estimated from experience. If there is any advantage in the use of electricity for this work, the management wants to gain it. But after consulting with electrical engineers, the problem is found to be not an engineering one, but one of operation and policy. The fact appears that electrical equipment is not so expensive as to be prohibitive if a greater traffic is developed, and there is no question that the trains could be run satisfactorily by electric motors. Fuel is cheap and water can be obtained at several points to use with condensing triple expansion engines for the central stations. It would be cheaper to equip with steam locomotives, and would be considerably cheaper to operate while few trains are run, but it may be that soon after the road is opened a trolley system will be started between the towns and there will be little or no local traffic for the road. Besides, the trolley lines may carry local freight, and if the road is run with steam locomotives it may not be long before its traffic is taken away, as has been the case where trolleys have paralleled steam roads in other suburban districts.

On the other hand, if electric equipment is used, and the freight and passenger trains and trolley cars are run on the same rails, there will be no inducement to construct trolleys in the highways between the country towns, and the majority of the passenger movement can be confined to the road, with the opportunity of charging somewhat more fare than would be the case if competition of the trolley had to be met. Under the railroad law the fare can be greater than under the town ordinances, where it is usually fixed at five cents. Again, there is the possibility of selling electric light and power to local towns. These considerations have compelled an entirely new investigation of the situation on a different basis, taking the possibility of running the trains by electricity as an accepted fact, and considering the greater fixed charges for electric power. In brief, the problem of making a profit from the operation of roads by electricity is generally one of "business" rather than strict technical engineering, and requires the same kind of ability that has been used for years in considering the opening of new lines with steam locomotives.

The success of the Westinghouse underground system for conveying current to electric cars, and the favor with which it is received by engineers have stimulated the efforts of inventors to produce an equivalent, and several inventors and electric companies are working on schemes that will get rid of the trolley poles and avoid the expense and complication of a conduit. The overhead plan used on the Baltimore tunnel is out of the question for general use; it is far too cumbrous and expensive. All of the cheaper and smaller conduit systems have been found impracticable in bad weather, and they cannot be used where there are crossties. The third rail plan, used on the Liverpool and on the Metropolitan in Chicago is practicable on an elevated road, but for obvious reasons could never be used on a surface road. For light work where there are only two tracks and where poles can be used, the overhead trolley is the simplest and cheapest plan so far practically tried, but when the work is so heavy as to require the large poles used on the Nantasket Beach line, it is questionable whether the interference with signals and the obstruction to view are not so great as to be objectionable. Where there are many tracks, as in a switching yard, the trolley pole seems to be out of the question, as it is not only a serious obstruction to the view of the trainmen when making up trains, but it is dangerous because the tracks are not far enough apart to permit the presence of the poles where men are swinging on and off cars constantly.

Freight yards are now the most promising field for the introduction of the larger sizes of electric locomotives, as the work can be done by them more economically, and with less noise, dirt and smoke. It has been proposed to use storage battery locomotives and to have stalls where tenders loaded with storage batteries may be charged, and the electric locomotive can be run up to the sheds to get a freshly charged tender and deliver an exhausted one in about the same time that is now required to take water and coal. Some such plan was used at the World's Fair with electric launches, a number of them being kept in charging sheds while others were in operation. All these schemes have objections that are at present worrying those electricians who have paid more attention to booming electric locomotives than to devising schemes for using the apparatus after it is made. It is only now that they are realizing that they have no satisfactory plan in practical use to propose for switching yards and similar places. The one probable exception to this statement is the Westinghouse underground system, which has been developed for that purpose. There are no poles and there is no obstruction to a full view of the cars. This system has been recently described in the *Railroad Gazette*. It is the equivalent of this system that inventors are seeking, and well-known electricians are working on it, which indicates that they are themselves dissatisfied with all they have proposed heretofore for the operation of large terminal yards.

The Control of the New England Railroad.

After the conventional period of mystery, it is at last publicly admitted that the control of the New England Railroad has passed into the hands of the Consolidated system. The announcement occurred without causing even a ripple in Wall street. There are two reasons for this absence of startling effect. In the first place, not only the street, but the outside public, had long ago reached the conclusion that this was the destiny of the new reorganized company ever since mere suspicions were confirmed by the appearance of Mr. Pierpont Morgan as purchaser of the property. Such a move seemed right in line with the recent policy of the Consolidated, which dates from the appointment of Mr. C. P. Clark as President. Recently, also, the New Haven road has begun the work of improving the air line track which forms the connecting link with the New England at Willimantic, an act which looked immediately to more friendly relations with the latter road.

The other main reason why New England securities have not risen in value at the moment is found in the exact relation which is to exist between the two companies. The control of the stock rests now with the New Haven company, but the New England is not to be absorbed as an integral part of the Consolidated system, but is to be operated as an independent road on its own merits as heretofore, except that it will be run in harmony with the controlling road. The New Haven company in no way backs the new road financially, nor proposes to improve it or help it make both ends meet. This it must do for itself as it has tried to do before. The only change in the situation is the mutual advantage accruing to both roads from being operated for the same purpose and in the same interest.

The New Haven road gains certain very definite advantages from the control of the New England. It is freed once for all from the danger of a parallel line to Boston. The New England has for years been the plaything of financiers and speculators, and there has always been the chance for some energetic man to build it up into a dangerous rival to the Consolidated road. By this present move the position of the latter road is rendered secure. The New England adds to the lines controlled by this system some 533 miles of road, and puts every railroad in the State of Connecticut under one power, with the exception of the New London Northern, which is still in the hands of the Central Vermont, and the short Philadelphia, Reading & New England.

As far as traffic conditions are concerned, the new relation between the roads will probably bring but little change. In actual distance the line from New Haven through Willimantic makes the shortest road from New York to Boston by 21 miles, but the New Haven road, controlling the New York end has never allowed through trains to be run this way any quicker than over the other two routes, and for the last two or three years the New England has had only one through train each way. The other lines are so much better physically, and pass through so many more large towns, that there is not likely to be any marked change in the passenger trains at present. From the point of view of the New Haven road the most valuable feature of the New England is its fine freight terminals in Boston, which is likely to prove of great importance to the controlling company.

On the side of the New England road the advantages of the new arrangement are conspicuous. For the last few years this road has been fighting the consolidated at competing points against long odds and with certainty of failure. In its crippled condition, physically and financially, it has been hard enough for it to struggle along by itself, let alone fighting a powerful company for a portion of its traffic. Now this is at an end, and the New England property can be developed under the best attainable condition.

The history of the road has been so peculiarly unsuccessful that there is considerable doubt felt about the possibility of its ever becoming a live, self-supporting property. In answer to this feeling there are two facts to be remembered. In the first place the burden of the fixed charges has been quite out of proportion to the earning power of the company, but the new reorganization has been a fairly severe one, and has cut down the capitalization to a reasonable figure. The second point to be recalled is that, for a time at least, this road was worked successfully and made to pay well. This was accomplished under the receivership of Mr. Charles P. Clark, and it was done largely by the active development of the local traffic and by giving up in the main the attempts to take the through traffic away from the level and direct lines of powerful rivals. The success of this policy suggests the plan which must be followed in the future.

With harmony between the two companies secured, the main obstacle now remaining to the successful operation of the New England on its own merits is its poor physical condition. When the receivers took control the road and the equipment were in a truly wretched condition. In their last report they say that a few hours before the appointment of the receivers attachments took out of service 43 locomotives and 300 freight cars, and there were 20 other locomotives in the shops for repairs, and 10 new ones were not available because they were too heavy for the bridges; thus 34 per cent. of the entire locomotive equipment was not available for use. The freight equipment was in "a generally poor condition." The road "had not been ballasted for 11 years and an insufficient number of ties had been provided for 4 years previous," and "extensive repairs were necessary on many of the bridges and buildings." The receivers have done what they could and all that they could, we have no doubt, to bring up the condition of the property. In 1894 they spent $273,000 on improvements and extraordinary repairs charged to operating expenses, which included rebuilding, or generally overhauling, 17 locomotives and 1,000 freight cars. Nevertheless, this was a very small part of the amount of money which it is necessary to spend to bring the property up to an efficient condition. Of course until all this state of things is done away with there is no hope for the success of the New England as an independent road, and it is natural that the Consolidated would be very slow to take upon itself the burden of doing any of this work for the other road. The first duty of the officers of the New England will therefore be to get rid of the floating debt and to put the property as fast as possible in such sound physical condition that it will be able to stand firmly on its own feet.

The Anthracite Situation.

There has been a decided improvement in the anthracite coal industry since the latter part of August. Low prices were recorded in July, and at one time they were on a basis of $2.75 f. o. b. net for stove size. The average for that month was a few cents higher, being for stove $2.85. The current figure now ranges from $3 to $3.25 f. o. b. net, tidewater. The first advance of 25 cents a ton was a reaction from the very low prices. The second of 25 cents was started by the Lackawanna, that company announcing one day last week that hereafter its prices would be on a basis of $3.25 f. o. b. tidewater. Reading, Lehigh Valley and Delaware & Hudson followed with advances equal or somewhat less in amount, and other interests are coming into line. In a demoralized coal market it is difficult to bring about a radical change "over night." There are always stocks in second hands that must be absorbed, contracts on which deliveries are demanded, a favored class of customers who, under threat of diverting

business, are able to secure "another cargo" at the old figures. These factors have been somewhat of a check upon the advancing tendency. However, they are being eliminated day by day, and there is much promise that within a comparatively short time $3.25 net f. o. b., tidewater will be obtained on coal.

The companies have universally adopten the policy of selling at the new figures only for immediate delivery. This prevents a mortgage on the future, and is good evidence that a further advance is expected. President Fowler, of the Ontario & Western, says that in all probability there will be another advance next week of from 15 to 25 cents a ton On Tuesday the statement was published that Lackawanna would on or before Oct. 1 advance its tidewater prices 25 cents more, making the f. o. b. price $3 50. The company on the day named advanced its Buffalo price to $3.75 and its Albany circular $3.50, $3.65 and $3.75, according to size. Advances to a similar or less extent have been made at all line and Western points. At the lake ports the higher figures are being readily obtained owing to an advance of some 30 cents in lake freight since spring. At Chicago $4.50 per ton, on the dock, is generally asked.

The current quoted rates, together with the average actual net prices f. o. b. tide water derived for coal during July, the low month, and for a series of Septembers, follows:

	Current asking price.	July 1895.	Sept. 1894.	Sept. 1893.	Sept. 1892.
Broken	$3.00	$2.75	$3.25	$3.70	$3.65
Egg	3.15	2.75	3.25	3.75	4.05
Stove	3.25	2.85	3.40	4.20	4.35
Chestnut	3.25	2.75	3.40	4.25	4.30

The causes of this improvement are in part in question and in part very plain. Restriction has been going on since May 1. Up to that time the production for the year was 2,711,416 tons in excess of that of a similar period in 1894. By July 1 this increase had been reduced one-half. Since the last named date there have been no figures published, owing to the refusal of Lackawanna to furnish a statement of its operations, which led other interests to take similar action. On April 1 the interests at a meeting concluded that despite the increase of two and one-half million tons up to that time, there was no more coal in first, second and third hands than in April 1, 1894. The fact that this excess of two and one-half million tons was reduced one-half up to July 1 is regarded as good evidence, in view of the balanced condition on April 1, that the country was on July 1 actually behind one and one-quarter million tons, despite a statistical increase of about that amount. Probably a portion of this loss is accounted for by stocks in second hands accumulated at the low prices. Even this point is mooted, it being maintained by producers that the low prices frightened buyers, creating a hand to mouth policy.

Be this as it may the statistical position of the industry is regarded as healthy. Coupled with the apparent shortage is an excellent demand for Fall and Winter requirements. This can be met only in part, owing to a shortage of cars, that in the last week or ten days has grown pronounced. An even more potent factor in keeping down the production is the scarcity of water at the mines, available for steam purposes. Some of the collieries are operated on water drawn in tank cars, others are closed. The average is probably three days or under per week. Add to these deterring factors an indisposition of the interests to mine at current rices any more coal than is required to hold customers, and it will be seen that the advance in prices is at least well founded and in the logic of events ought to be stable.

The Wall street belief that a coal combination, so called, is back of the improvement has not wavered. The argument is that the apparent harmony in the trade permitting the improvement, when contrasted with the stormy scenes of the late winter and spring, shows that there is a directing power beneath the surface. Moreover, comparatively high prices at which the various securities of the coal roads are selling, despite the very bad year for the industry, is regarded as evidence that the future has something more in store than an improvement based on natural developments. Again there are from time to time occurrences that strengthen the belief of a general plan of concentration. Among these may be mentioned the acknowledged absorption of Reading stock, the change in control of New York, Susquehanna & Western, and the most recent, the transfer of a yearly tonnage of 300,000 from the last named company to Ontario & Western through a sale of the John Jermyn coal lands to the Johnson Coal Co. This is 25 per cent. of Susquehanna's tonnage. The change will benefit the trade as the last named company had in 1894 more coal than it could sell, and in consequence was a menace to the market.

In estimating the resources of the Transandine Railroad, soon to be completed, a charge of $12.56 per ton on the freight over the 150 miles of road is allowed, which is at the rate of 8¼ cents per ton per mile. The chief traffic over the mountains now consists of cattle driven over from the plains of the Argentine Republic to Chili, and for these it is estimated that the railroad can collect $10 per head. These seem pretty steep prices, but some of our Rocky Mountain roads in their early days have been able to collect as much, which was an important reduction from the cost of teaming, and in a barren mountain pass, of driving even. But anything like these rates are likely to prohibit any considerable shipments over this route between the Atlantic and the Pacific. It is 644 miles from Buenos Ayres to Mendoza, the eastern terminus of the Transandine Railroad, and the charge per ton over it is reported as $61.44. On the 83 miles from the western terminus, at Los Andes, to the Pacific, at Valparaiso, the freight is given as $2.10. This would make the cost of a shipment over the entire 877 miles between Buenos Ayres and Valparaiso $76 10 = $3.80 per 100 lbs., which vessels around the Horn will take pleasure in cutting. It will be noticed that only one rate is given, as if there were but one class of freight, and we may presume that the railroad authorities will not be stupid enough to insist on rates which drive away all the traffic. Moreover, the charge over the long level of 644 miles in the Argentine Republic over a broad plain at the rate of 9½ looks suspicious, and as if it were in the greatly depreciated paper currency of that country. Nevertheless, it is reasonable to suppose that the bulk of the Chili imports will continue to enter Valparaiso by sea, and that the chief support of the Transandine Railroad will come from the interchange of Argentine and Chilian produce. The estimates of traffic over the road seem not particularly extravagant. These assumed a daily movement of 94 passengers, 8,800 lbs. express goods, 20 tons fast freight, and 44 tons of ordinary freight over the line.

On Sept. 22 the trains on the double track lines of the Old Colony System of the New York, New Haven & Hartford began running on the right hand track, changing from a plan which had been in vogue since May 17, 1854. The plan of running on the left hand track prevailed not only on the Old Colony proper but also on the Worcester Division, formerly the Providence & Worcester Railroad. Aside from the general consideration, of uniformity with the practice of other companies, and with the practice of carriages and pedestrians on highways, this change was desirable to make the practice consistent on all the lines of the New Haven Company; for the New York, Providence & Boston always used the right hand track, and all through trains between Boston and New London had to cross from one track to the other at Providence. The expense of the change in this case must be very considerable, as the Old Colony has a great many automatic signals and a good deal of interlocking. The Boston papers state that the work of changing the switches, signals and station arrangements is expected to take three weeks.

NEW PUBLICATIONS.

Popular Engineering, Being Examples of Engineering in all Branches, simply described and especially written for those about to enter the Engineering Profession, and for the scientific amateur; with chapters on Perpetual Motion and Engineering Schools and Colleges. By F. Dye. London: E. & F. N. Spon. New York: Spon & Chamberlain, 21 Cortlandt street. 1895. 470 pages, with numerous illustrations and index. Price $3.

In Mr. Dye's preface he explains that this work is written in a plain and descriptive style, for the reading of those who do not follow the profession of an engineer, or for the youth who aspires to some department of this profession, or wishes to gain an intelligent knowledge of what the subject embraces. He has taken up the various divisions, chemical, civil, mechanical, electrical, marine, military and mining engineering, and in each chapter he gives numerous examples of works constructed. The descriptions are necessarily short and the illustrations are necessarily not very detailed, although numerous. Yet the examples of works and of the ways of doing things are so comprehensive that the book will surely interest and instruct the ingenious boy and will give many a practicing engineer pointers as to things that he would like to look up further and know more about. But the examples drawn from American practice are not very many, and are usually not recent examples. Under canals, for instance, we find the Welland canal but not the St. Mary's. Under bridges we find a long reprint of parts of an absurd paper on bridge failures in America, with a number of illustrations that have no possible value; but we do not find a single one of a dozen magnificent structures built in this country, which would be more interesting and important than anything that the author has shown. The man in search of accurate information will be disappointed too at the meager use made by the author of accurate dimensions and weights. Indeed, the reader who is only moderately well-informed, will be astonished by many of the selections of examples, and surprised to see how much has been left out. Still, the primary purpose of the book was to inform and interest young persons and amateurs and for that it is well designed. It closes with an entertaining chapter of 25 pages on various perpetual motion contrivances.

TRADE CATALOGUES.

Corbitt & Burnham, of Chicago, have issued a circular containing samples of their "day and night" time-tables, in which the letters a. m. and p. m. are discarded and the time from 6:00 p. m. to 5:59 a. m., inclusive, is shown in white letters on a black ground. With this style of type, heretofore noticed in the *Railroad Gazette*, the schedules of all trains running between the hours named stand out in a very striking manner, the black block for the figures 10:40, for instance, being in an ordinary time-table, about $\frac{3}{16}$ in. × $\frac{5}{16}$ in. and the figures rather light-faced. The circular also shows a design of a clock dial in which the hours from 6:00 a. m. to 5:00 p. m., inclusive, are in the upper half, on a white ground, and the others in the lower half, on a black ground, the design requiring the hour hand to make but one circuit in 24 hours. Time-tables printed in this firm's type are now used by the Chicago & Eastern Illinois, the Louisville, New Albany & Chicago, the Cleveland, Cincinnati, Chicago & St. Louis and the Baltimore & Ohio Southwestern. Testimonials are printed from officers of these roads. The General Passenger Agent of the last named says that, after using these types, in folders, for five months, he finds that they give perfect satisfaction.

Notes in England, by a Delegate to the Railroad Congress.

Since returning from the great Railroad Congress I have been asked what impressed me in England, "did I learn much" and similar questions. To tell in a short conversation even a few of the many objects of interest that presented themselves in that busy fortnight is rather difficult, but there were certain ways of accomplishing ends that left a strong impression. The same thing would not affect two persons alike, and it is with considerable hesitation that I venture to mention what attracted my notice. The articles in the *Scribner's* by Mr. Prout, Mr. Acworth's book and numerous other books describe well English railroads—their chief characteristics. These remarks are rather of the nature of a few snap shots with a mental kodak with good will to all and malice toward none.

I may say at the outset that the conditions of traffic are so different that one country has but little to adopt of the other's methods, but where practically similar conditions pertain there is a growing resemblance of means to meet them. The corridor train and dining car are well nigh universal in long journeys. The corridor or vestibule is often to one side of the center of the car, necessitating more collapsing and expanding paraphernalia.

The sleeping car is in extensive use. I had one unpleasant experience in these cars, designed as they are for privacy (?) I was alone, the compartments opening into a side aisle being arranged for two; consequently on retiring I was boxed up with an entire stranger, who kept the window wide open all night. What little sleep I had was marred by dreams of sleighing. Nor have these cars any provision for sitting up, either prior to retiring or in the morning. The berths are not convertible into seats, and one must confine himself to sitting in a small chair in the cross aisle of the car. If I had not learned it at school I should have known well ere that night was over that a circle is but many straight lines, for although the car was a bogie we passed all curves with numerous yanks and jerks.

This brings me to a word as to track. Most Americans have an idea that *all* English track is equal to our best. It is not. There is much fine track, to be sure, but also much that is not. Some joints on one line, and a main line at that out of London, can be found by the formula 5280 ÷ 30 × 2 per mile. In this case I was on the engine and could see them perfectly. The chair and rail is the universal custom in England, but there are many T or Vignoles rails in Ireland. Most English lines key them on the outside, but the Midland keys them on the inside. The rails themselves are, I believe, better made than most of ours, but I cannot give my reasons at this time. The North Western is using and making at its works at Crewe 60-ft. rails. It is, however, the only line using such long rails. This line and the Lancashire & Yorkshire, I think, are the only lines where the driver is on the left side of the engine.

An engine driver in England and with us are two different persons. Owing to the completely enclosed lines and signals, there is not the same amount of time given to peering ahead and more to the steam gage and fire. When an English runner sees his signal clear for a block ahead he feels confident of his line. Even on a fast run I noticed this. The enginemen are careful not to let smoke escape in stations. At any time their engines emit but little.

The stations have much glass in the roof—are clean and bright. Cabs drive up between the inward tracks so that a porter quickly gets one's luggage, and off he is. The platforms are 2 to 3 ft. high, thus exit and ingress are comfortable and easy. When we are more experienced we shall have them at least a foot high. The so-called rail level platform is productive of many strains to short people and a delay in passing to and from the train. The fact that at some very busy stations in this country as Indianapolis, the moderate platform is used, and there is no serious trouble in handling baggage, is an answer to that objection made by many. Altogether in England the station service is superior to ours. It is easier and more expeditious. Whether we could copy it in entirety I doubt, but we can, and ought to, in a measure.

The same cannot be said of the signal system. There has been but little development in signal practice on many lines in the past decade. A few lines south of London use the Sykes system, but with these exceptions any check on the signalmen letting two trains into the block is entirely mental. "But we mustn't. It's against the rules," said one in broad Yorkshire to me. More levers are used for the same work than we think necessary. There are no power signal plants. The Lancashire & Yorkshire and the North Western make their own apparatus. The North Western is the most striking example of a line which buys little but raw material. It builds its entire equipment and rolls its rails. While on the one hand this insures high workmanship, on the other it often tends to divert valuable traffic of rail mills and the like to other lines.

One is agreeably impressed by the cleanliness of English engines. They are kept as clean as when they leave the shops. The same may be said of the carriages. All live stock vans are required to be whitewashed inside at the end of a journey to prevent the spread of contagious diseases. Coal is piled in yards with large blocks laid up as a wall. The top rows of these are often whitewashed —for neatness, it is said—but one of our people said he was going to do it to prevent stealing. No doubt they, too, have this in mind.

In many respects there is absolute uniformity in rules throughout the United Kingdom. In traffic this is due to the Clearing House, about which much might be said In transportation it is due to the Board of Trade, but in those matters which are individual in character, as engine driving, there is a material lack of uniformity.

The North Western uses track tanks even in freight service exclusively, that is, I believe, all main line engines, or rather tenders, are equipped with a scoop. This enables a train to be run from Crewe up to London without a stop. On crowded lines this has an advantage. It also enables the line to use small and light tenders. On the Great Northern I understood there were no track tanks. This is interesting in reflecting on the recent speed contests.

In England, they do not consider it necessary to turn an engine in suburban or short run service, say up to fifty miles. They use a "double ender," saving time at stations and room of a table. These engines have side —not saddle—tanks and a small overhanging coal bunker. This gives weight where it is needed, and if the engine is properly designed it rides well, and is in every way a most efficient machine.

I was impressed with the limited width allowable in carriages. The extreme is, if I remember, but 8¼ ft. Even the Irish lines cannot get more on account of old walls and tunnels.

An interesting chapter in Acworth is that on the Broad Street Goods Station, London (L. & N. W.). Three of us saw it one night and think his description accurate. It is apparently all confusion, but in reality far from it. It is an "outward" bound station till midnight, then an "inward" one. The freight is collected largely by the company's wagons and carts. I say "largely" because there are others that belong to Pickford & Co. and other "carriers." These carriers are similar to our express companies. They collect numerous small parcels and fill a road car to, say Liverpool There Pickford & Co.'s wagons distribute to the various consignees. I understand that these carriers make their profit by charging their patrons about the usual freight rate for small shipments, but by concentrating a number of these they get the car-load rate.

It is astonishing to us, how small is the average car load—on somes lines less than three tons. The freight business of England is made up of many small shipments to many different destinations. At the Edge Hill (L. & N. W., Liverpool) yards where a large tonnage is handled, I was told that often one train was their entire freight for London—and London means a dozen different stations *in* London. There can be no question but that the small 8 to 10-ton truck, as used by them is better adapted to their use than our cars would be. On account of the use of the turntable in switching this is even true of the iron and mineral traffics. In passenger stock, the universal tendency is to "bogies" of 50 ft. and upwards in length. The North Western has a few dining saloons of 70 ft. over all, a big car even for us.

An American is struck by the number and character of the English railroad hotels. They are as much of a department of the company as anything else. The need of them arose from the inability of the old English inn to accommodate the increased travel brought to the large cities. This is the most important class as those at the London termini of the large lines, but then there are the hotels at the seashore and at resorts that the companies have built to encourage travel. Generally these ventures have have been eminently successful. Just now the Irish lines are giving attention to the development of the tourist travel to the wilder parts of the island, and although there are a number of good hotels, others are in contemplation. As a rule, all are well kept.

I was impressed on the South Eastern and to some extent on the South Western, at the effort made to screen the line by dense plantations of forest trees. Many of the trees are now quite large and effect their intended purpose well, even on heavy fills.

There is a conspicuous lack of any adequate means of communication between different cars even after the numerous assaults and accidents that have for the time created much talk and even parlimentary action. I did not see one that struck me as reliable, if needed. There are several devises requiring the breaking of a glass to pull down a ring and on other lines "a rope on the right hand side of the train above the door in the direction that the train is going." As trains generally run without turning, there is often an "idle" rope on the other side and the question arises as to whether when the villain jumps on you, you are going to have a clear idea of which is "the right hand in the direction in which the train is going."

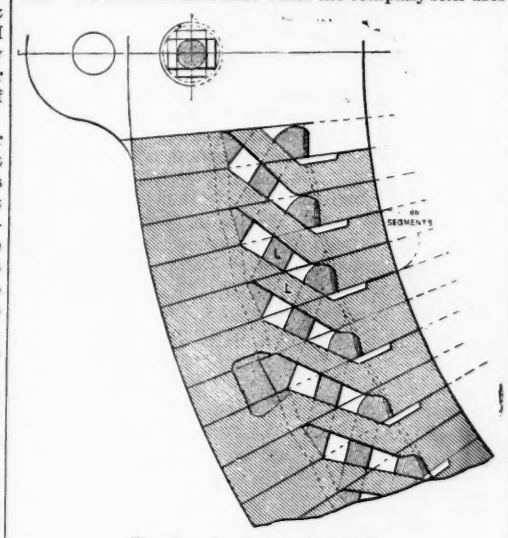
As to the future, there seems to be little thought of development, except to make everything of better material and workmanship. The through lines to the north try to reduce the time almost yearly. To do this they now use entirely, I believe, with the exception of the Great Northern, the coupled engine of about 7 ft. drivers. When an English runner starts his engine he pulls the throttle wide open at once. There is no wire-drawing. Some years ago the Scotch lines used outside cylinders, but the newer engines on the Caledonian have the usual inside construction. The other direction besides speed in which there may be improvement is the comfort on the through trains before alluded to. Competition is confined to service in passenger and freight traffic.

The English public are much interested in the development of the so-called "light" railway for the more sparsely settled portions of the United Kingdom—especially in the west of Ireland. As a rule the lines are not over 30 miles in length, of narrow gage and built by government assistance directly or indirectly. The relaxation of the Board of Trade requirements for such lines and new branches of the standard gage in districts of light travel is quite a question of the hour, and the late President of the Board of Trade, Mr. Bryce, is giving the matter much personal attention.

The great English companies are wonderfully well and efficiently managed, but there are not so many of them that have better tracks or equipment than we have, that one should let the frequent remark: "They have smoother and better tracks than we" be uttered without some qualification. Between the best, at home and abroad, there is little to choose. G. B. L.

The Faught Contracting Chill.

Those who have kept themselves informed as to the course of events in the gradual introduction of the use of the contracting chill for casting car wheels know that the Lobdell Car Wheel Co., has been among the most conservative in the use of the plain chill. Or to put the matter perhaps a little more accurately, that company has not been opposed to the contracting chill in itself, but has not been willing to concede to this system of casting all of the merits which its most enthusiastic advocates have claimed for it. The Lobdell Company has, however, convinced itself by examination and experiment that the Faught chill gives more natural contraction than any other contracting chill; that is, secures more contraction without first heating by steam and then cooling by water. The company is also satisfied that this chill has sufficient advantages over the plain chill to warrant its use. We are informed that while the company still uses



The Faught Contracting Chill.

the plain chill, and now has both kinds in use, as fast as the plain chills become unserviceable they will be replaced with the Faught contracting chill. This chill was described at considerable length last week in the *Iron Age*, from which journal we reproduce the illustration herewith, which shows the peculiarity of the chill.

Those familiar with the subject will remember that in the Whitney chill the chilling segments are attached to the outer rim by radial arms, and that the contraction is dependent solely upon the inward travel of the segments as these radial arms become heated and elongate. They will remember also that the Barr chill uses the same principle of radial arms, and in addition has a channel in the outer fixed rim through which steam may be passed to expand this rim, and through which cold water may afterward be passed to contract the rim, thus securing contraction not only by the inward travel of the radial arms carrying the segments, but by the contraction of the outer rim itself. These are the two great types of contracting chill now in use.

The Faught chill differs from the Whitney chill in that the arms which carry the chilling segments are not radial, but are inclined, as shown in the engraving; and it differs from the Barr chill in this respect and also in not having the channel for the use of steam and water. One advantage claimed for this disposition of the arms is that a greater length available for expansion may be obtained without increasing the diameter of the outer rim, which would of course add to the weight and cost of the chill and to the space required to use it. Two of these arms, inclined in opposite directions, are connected to each segment. Each pair of them, therefore, forms with a section of the outer rim a triangle. These arms are secants of the two equal angles of the triangle, hence the chill is called the "secant" chill. An advantage claimed for using these inclined arms is that an increased inward movement of the segments is obtained from the geometrical relations between the increase in the angles and the increase in their tangents. The increase of the inward movement is proportionate to the tangents of the equal angles of the triangles formed by the bars and the cord of the section of the outer rim. It is claimed further that this combination, in addition to getting greater movement, is a complete system of cross bracing for the chill against the action of the alternate changes from low to high temperature.

An experiment made by the Lobdell Company shows the contracting result with this chill. A 33-in. wheel, weighing 600 lbs., was poured in the Faught mold. It was poured flange down, the time of pouring being 11 seconds. Two minutes and 15 seconds after pouring, the cope, with the chill attached, was lifted. The hub and plate of the wheel remained on the bottom of the mold, while the tread and flange, which had become sufficiently set to retain perfect form, remained in the chill, which had contracted so much as to grip the tread tightly enough to separate it from the plate. The tread and flange remained suspended in the chill for 6 minutes and 19 seconds, when it had cooled enough to allow it to drop out of the chill. This experiment has been tried a number of times and always with the same result. The same experiment was tried with plain chills, but in each instance when the chill was removed the wheel remained intact on the bottom of the mold.

We do not feel called upon to express any opinion as to the relative merit of this and other forms of contracting chills, or competent to for that matter, but the main point is that the Lobdell Company has decided to use a contracting chill and to gradualllly give up the use of plain chills.

Storage Battery Car Lighting in Germany.

Mr. Staberow, a Prussian Government Engineer, read lately a paper in the Verein fur Eisenbahnkunde on the electric lighting of the passenger cars of the independent branch railroad Dortmund-Gronau-Enschede. The conditions were especially favorable to the selection of electric lighting, because first, the same trains of cars are hauled both ways between the terminal points, and second, the cars never leave their own tracks. A gas plant had not been established for gas lighting, the small consumption not warranting the expenditure. Kerosene oil lamps were in use. The change to electric car lighting in 1893, became feasible in connection with the electric lighting of the depot and yards at Dortmund. The plant installed for the latter purpose charges the batteries during the day. The reserve batteries are used for the lighting of several engine stands. According to *Glaser's Annalen* the paper and the discussion of the same are in part as follows:

The cars are of the standard compartment car type. There are four classes. A first-class compartment has six seats; the second, eight; the third 10 seats, wooden benches; the fourth, standing room only. The specified illumination required sufficient light for reading on each seat of the first and second-class, and for the clear distinction of objects for third and fourth-class. Accordingly, there were installed, per compartment, incandescent lamps as follows: First-class, one 16 c. p. lamp; second and third-class, one 10 c. p. lamp; fourth-class, one 6 c. p. lamp. The third-class lamp served for one or two compartments, according to the construction of the car. With 15 volts between terminals, the current consumption is 2.20 amperes for 16 c. p., 1.60 amperes for 10 c. p., and 1.06 amperes for 6 c. p. lamps; and the energy required per candle power for the three grades of lamps is 2.5 volts, 2.25 volts and 2.0 volts respectively. On this basis the batteries were calculated.

All the batteries were made alike in size and capacity, and arranged to satisfy the requirement of a first and second-class combination car on the shortest winter day. They yield 90 ampere hours, and as said car has one 16 c. p. and three 10 c. p. lamps, consuming 6.2 amperes, the battery would light the car for 14 hours. Considering, however, the bad effect of complete exhaustion or the life of the battery, the discharge has been limited to 80 ampere hours under the following schedule: Discharge of a battery in a car of the first and second-class, 13 hours; in the third-class, 18 hours; in the fourth-class, 45 hours.

The cells are of the Tudor type, manufactured by the Hagen Accumulator Co. Each cell has seven positive and eight negative plates placed $\frac{5}{16}$ in. apart between non-conducting fillers in an ebonite casing. Some cells were filled with liquid, others with gelatinous electrolyte; the elastic support of the cells, detailed below, works so well that it is found unnecessary to gelatinize the electrolyte, and for all renewals the ordinary liquid is used.

There are eight cells for each car of five compartments, placed, for easy handling, two in one box; these boxes are pushed by hand into a large wooden box with a yielding double bottom and in which they are held firmly in place by rubber wedges and by a spring bar which presses against them when the front door is closed. A small box containing two cells weighs complete 52 kilograms (114.64 lbs.) and the total increase in car weight by reason of the battery, including the iron supporting frame is 280 kilograms (617.3 lbs).

A twofold contact is provided between cells and with the main circuit of the car; first, by elastic cables on stoppers, and second, by the afore-mentioned spring mounted bar, the springs pressing against metal contacts on the cell boxes and on the side walls of the outer

box. The car wiring contains a safety fuse at the main switch and one at each lamp.

A clockwork which runs while current is flowing, counts for each car the hours of discharge of the battery. The dial shows numbers up to 60; a red mark on the glass indicates the number of hours for the car. The operator (there is only this one attendant for the entire plant) reads the dial upon arrival of the train at Dortmund and resorting to data tabulated for each month finds out whether the battery will stand another round trip. If it does not, it is pulled by hand on a narrow gage transfer wagon, and either placed under a lower class car, if there is still sufficient energy left in it, or recharged. A generator furnishing 100 amperes at 65 volts with 1,350 revolutions per minute and a 10-H. P. Otto gas engine are installed with all necessary instruments and resistances at the end of the passenger platform and are capable of charging 18 batteries or 72 boxes containing two cells each. Gas was selected as motive power in preference to steam on account of the limited space at disposal, the cheapness of the gas (10 pfennig per cubic inch equal to 67 cents a thousand cubic feet) and the irregularity of the service. In December, for instance, the generator is operated frem 6 a. m. to 7:30 a. m. for yard lighting; 10 a. m. to 3 p. m. for battery charging, and 5 p. m. to 10 p. m. again for yard lighting. As it is, one man can do all the work.

It takes an average of five hours to charge the batteries, and in December and January they have to be charged every other day. When charged they have 16.2 volts (20 volts including inner resistance). It is discharged to 14.8 volts. By trial, extending over a long time, it was determined that a 16-volt lamp is preferable to a 15-volt lamp under these conditions. The 16-volt lamp has a longer life, and the expectations of a better light from a 15-volt lamp towards the end of the discharge were not fulfilled. During these experiments 18 renewals of lamps or fuses became necessary in one year.

As compared with the lamp hours for oil lamps, the electric light showed a saving of 34 per cent. for the six winter months, and of roundly 50 per cent. during the first twelve months of operation. This is explained by the fact that there is no train service between 10:30 p. m. and 6 a. m., in consequence of which the loss by too previous lighting of the oil lamps in summer appears as very high proportion, and also by the fact that it is no longer necessary to light the lamps during a longer stop at station, but they can be lit by the turning of a switch at any time, and while the train is running.

It may be remarked here that in European practice, where oil lamps are in use, they are put in from the roof of the car. They are held in readiness already lighted at a certain station. Upon arrival of the train the day dummies are removed and the lighted lamps placed in their stead.

Cost of Installation.

	Marks.
1. Building for charging station	3,200
2. Plant for same	11,200
3. 20 batteries complete	9,250
	23,650
4. Cars:	
6 cars, 1st and 2 d class, 4 lamps, at	550 3,300
12 " 3d class, 3 lamps, at	450 5,400
8 " 4th class, 2 lamps, at	380 3,040
1 inspection car, 9 lamps, at	850 850
5. Wiring for light in charging station	60
Total marks	36,300

equal to about $9,000, but equivalent in purchasing power of money to about $18,000; all necessary changes of the cars are included. The equipment of new cars would be a good deal cheaper; nevertheless it has been from 80 to 200 marks cheaper to equip the cars for electric light than it would have been to equip them for gas light.

The entire installation was put in by the Allgemeine Electricitaets Gesellschaft, of Berlin.

Cost of Operation.

The above mentioned saving in lamp hours by turning off of lamps in unoccupied cars, and other reasons, shall here not be considered, so as to make the resulting cost per electric lamp hour available for a comparison with that of gas. The number of lamp hours is 56,400 during the time from Nov. 15, 1893, to Nov. 15, 1894, if figured by the train schedule, the class of cars composing the trains and the lighting table. During said periods careful notes were kept of the consumption of materials, wages and other expenditures, separated for car lighting and for depot and yard lighting.

The cost of operation is made up of—

1. Deterioration of lamps (400 lamp hours)	Marks 389
2. Running of the charging plant:	
a. 2905 cubic meters of gas at 10 Pf.	M. 290.50
b. Water, oil, waste, etc	98.50
	389
3. Wages	503
	M. 962
In future it will be necessary to add for maintenance of batteries, 6 per cent, upon their first cost	540
Total	M. 1,502

(Said 6 per cent. is the contractor's guarantee for five years.)

The charging station did 6 per cent. more work for depot and yard lighting than for charging of batteries. For interest charges it will be close enough to charge of the cost of installation to train lighting one-half the cost of the charging plant, two-thirds of the cost of the building and of course the full cost of car changes and batteries. This figures up to mark 29,400. The cost is then as follows:

	Marks.
Above accounted for	1,502
4 per cent interest on mark 29,400	1,176
3 per cent. renewal fund	882
Total yearly cost	3,560

Therefore 3,560 ÷ 56,400 = mark 0.0633 per lamp hour of 10 c. p. average, equal to 1.4 cents.

An estimate for car gas lighting for this same railroad resulted in a cost of 0.084 marks per lamp hour of 8 c. p. Other European railroads had for an average 10 c. p. lamp hour the following results:

Jura-Simplon Railroad includes 4 per cent. interest and 4 to 6 per cent. for renewal fund. Mark 0.041.

Danish State Railroad includes 4 per cent. interest and 3 to 5 per cent. renewal fund. Mark 0.0615.

Conclusion.

Irrespective of cost the following advantages are claimed for the electric light over gas light in the lighting of European passenger cars: 1. The gas flame must be in connection with the outer air; consequently the glass globe is soon filled with particles of the locomotive smoke and even water in heavy rain storms; this reduces the already weaker light. 2. The lighting of the gas has to be done either in the compartment (when it is annoying to passengers) or from the roof (when it is dangerous for the attendant). Passengers are greatly annoyed, who have to remain in the cars during the filling of the gas tanks. Again in railroad accidents the burning of cars has been attributed to the gas light. These several disadvantages of gas are avoided without the advent of new ones by storage battery electric lighting. Trial cars thus fitted on the government line from Berlin to Frankford are said to give entire satisfaction.

The paper was discussed by Messrs. Pintsch, Leissner, Schrey and Bork.

Mr. Pintsch claims that old incancescent lamps yield only one-half the original candle power when the potential decreases two volts. He also denied the damage from fire by using gas, and cited instances of fires caused by using electricity.

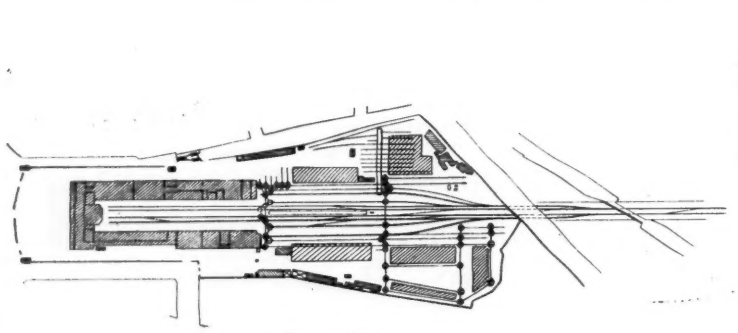
The London & Brighton Railroad fitted its 800 passenger cars for gas after having lighted all said cars with electric light from 1879 to 1892. The Midland Railroad also discontinued its electric car lighting experiments extending over many years.

Mr. Staberow replies that safety fuses correctly applied are an absolute safeguard against the danger of fire from light wires.

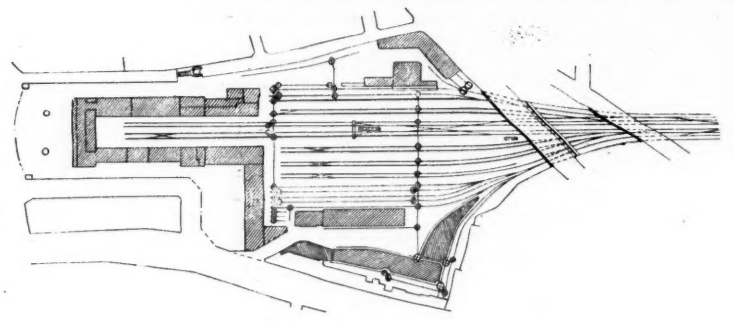
Mr. Leissner acknowledges this to be the case in ordinary operation, but doubts the effectiveness of fuses in collisions. He broadly denies the objections raised against gas lighting.

The actual cost of a 9 c. p. gas lamp hour may be stated as averaging 0.02 marks (½ cent). The electric lighting of mail cars is done exclusively by storage batteries of sufficient size to furnish light for a 24 hours' continuous run, 11 to 14 gas flames are replaced by 9 to 11 incandescent lamps of 12 c. p. at 30 volts. The lamps are connected in parallel. The battery is located in, not under, the car body. There is a two-pole safety fuse for 15 amp. at the battery proper, a single pole fuse for 15 amp. at the main switch and a 5-amp. fuse at each lamp. Lead batteries, system Boese, are employed, weight of battery 208 kg. (457.6 lbs.); average charge and discharge current, 6 amp.; capacity, 120 amp. hours.; potential 2.1 to 1.75 volts; output, 3,696 watt hours; first cost, M. 460 ($115); subsequent renewals, M. 276 ($69), when used up parts are returned.

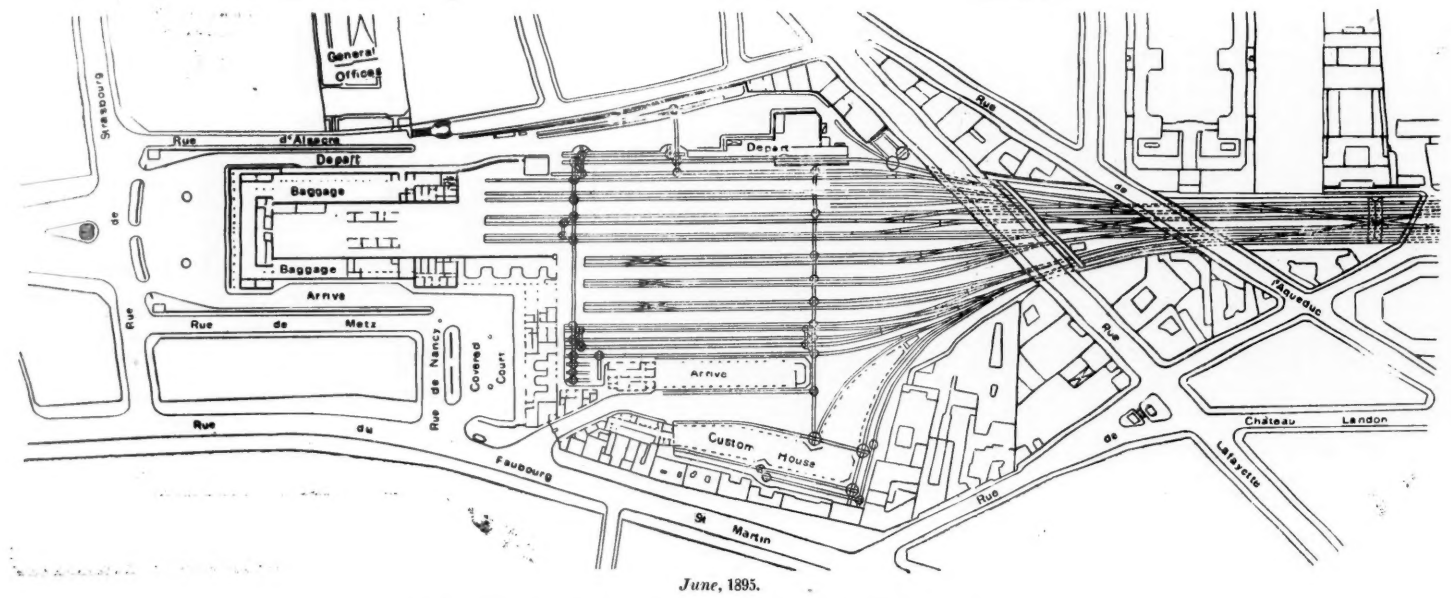
It takes 5,850 watt hours to charge a completely exhausted battery and 20 to 22 hours to do it in. Said data are taken from the *Archiv for Post und Telegraphic*, which also says that there is a considerable saving in lamp hours over gas, interruptions are no more frequent and their causes easily found and remedied. In an operation extending over 1½ years no interruptions have occurred which are attributable to the batteries proper.



Before 1881.



1891 *to* 1895.



June, 1895.

Enlargement of the Eastern Railroad Station, Paris, from 1881 to 1895.

There are two kinds of cars, the electric equipment costing M. 785 and M. 1,281, while the equipment for gas costs respectively M. 787 and M. 1,350.

The life of the batteries is as yet unknown. The cost of the current is 1,000 watts M. 0.16 to 0.24 (4 to 5 cents). A lamp burning 211 hours costs M. 1.00. Not counting charging station and battery, the ascertained cost per lamp hour is:

(1) for lamps 100 ÷ 211 = M.	0.0047
(2) for energy (current at M. 0.16)	0.0037
Total	0 0084

If 20 per cent. be charged to the renewal fund of batteries, 10 per cent. to that of the charging station, and 6 per cent. interest, the saving over gas light amounts to 21 per cent., but the electric lamp hour costs 1½ times as much as the gas lamp hour of an ordinary passenger car.

Mr. Schrey spoke of the inconvenience of having the lights of the entire car go out if the battery should get out of order. That could not possibly occur with gas light.

Mr. Bork, who is in charge of the shops at Tempelhof, Berlin, and who equipped the first and subsequent mail cars, considers the results reached with these cars as satisfactory. There is no danger of fire worth mentioning. The charges for interest and renewal fund are probably less for battery lighting than for gas lighting, and the ratio of cost per 12 c. p. hour is 84 for electric light to 110 for gas light, if gas costs $2.68 per thousand feet. Railroads considering a change from kerosene oil lamps should give electric light the preference over gas.

Passenger Station of the Eastern Railroad at Paris, France.

European exchanges bring, in constantly increasing number, reports of necessary extensions of railroad stations at terminal points in large cities. Buildings, yards and approaches, as a rule, date back to the earliest beginning of railroading on the continent. They are closely built in on all sides and offer correspondingly great difficulties to changes, as such changes involve the temporary reduction of trackage already taxed to its capacity. A noteworthy and rather typical instance of this kind is the change now taking place in the terminus of the Eastern Railroad of France, at Paris. The development of this passenger station is thus sketched in *La Revue Technique:*

In 1849 there were five tracks, two for arrival, two for departure and a service track in the center. A platform on either side leading to a head platform, a shed covering the platforms, and a building surrounding three sides of the shed with separate offices and service for arrival and departure completed the depot.

In 1857, the facilities becoming inadequate, two groups, consisting of two tracks and a platform each, were added outside the shed, one on the arrival and one on the departure side; 39 turntables were erected to connect said tracks with each other and with the several car storage tracks, as well as with the sidings and buildings for mail, express and dutiable baggage, each duplicated for arrival and departure.

In 1878 the service track in the center of the shed was taken up and a platform built in its stead. Direct access was thus given to four arrival and four departure tracks.

The railroad approaches the terminus in a cut which near the depot has room for only four tracks, two main tracks and two switch tracks on the outside. This arrangement necessitates the crossing of the main tracks when cars are transferred from the arrival to the departure side. The number of trains increased and the service became more and more involved.

In 1881 the two switch tracks became wholly insufficient and the cut had to be widened. The stone bridge next to the depot, in the line of Lafayette street, having two arches of only 22 ft. in the clear each, was removed and replaced by a steel truss bridge of 230 ft. span. Thus room was gained for six tracks in the cut.

But in 1889 the number of trains, by the advent of suburban service, had increased to such an extent that it was again impossible to clear the arrival tracks quick enough and the transfer of cars seriously impeded the arrival and departure of trains. The arrival tracks were at that time divided into two groups, one for arrival from Strassburg and one for arrival from Mulhouse, each having its own baggage rooms, etc. This subdivision was now abolished; by furthermore removing the several buildings for mail, express and dutiable baggage to the extreme sidings, with access from outside streets, room was made for three additional arrival tracks, gaining thereby greater time intervals between transfers.

Finally in 1893 it was found necessary to break altogether with the system of separate tracks for arrival and departure, to do away with the switching of cars from one side of the yard to the other. An entire reconstruction was resolved upon. The old shed has been entirely cleared of tracks. Building and shed are reconstructed into one large building mainly for departure with a side wing for arrival. Two carriage ways lead into the depot. There are six tracks used for arrival and departure of suburban trains and eight for long distance service.

All this has been effected on the original right of way. But the imminent insufficiency of the not yet completed reconstruction is already clearly foreseen and steps are being taken to obtain for the railroad the right of condemnation of adjoining private property.

TECHNICAL.

Manufacturing and Business.

J. A. Fay & Co., of Cincinnati, manufacturers of wood-working machinery, report a rapidly enlarging demand from railroads. The firm is now furnishing machinery for the Mexican International, the Illinois Central, for its new shops at Burnside, Ill., the Queen & Crescent, the Big Four, Missouri Pacific and the Jacksonville, St. Augustine & Indian River. It has recently equipped the new shops for the Baltimore & Ohio Southwestern at Washington, Ind., sold important orders to the Pittsburgh & Lake Erie Co., the Kansas City & Gulf Railroad, the Mobile & Birmingham the Lenoir Car Co. at Lenoir City, Tenn., the New York Central for its Utica shops, and a number of others, and anticipates an increased trade in this department for some time to come.

Henry J. Reynolds, chief engineer of the Great Lakes steamer "North Land," writes that he has had much trouble with corrugated copper and other packings for steam and hot water pressures of 286 lbs. and 500 to 600 lbs. respectively, but now uses "Rainbow" packing and finds it entirely satisfactory for all high pressures.

The Westinghouse Air-Brake Co. has declared a quarterly dividend of five per cent., and an extra dividend of 2½ per cent., payable to the stockholders on Oct. 20.

The Hunt narrow gage industrial railroad tracks have been put in the Ansonia Brass & Copper Company's Works at Ansonia, Conn., and the factory of the Thorndike Company at Thorndike, Mass. The Ansonia Company uses a gage of 21½ in.

New Stations and Shops.

The West Jersey road is to build a new brick passenger station at its Jackson street terminus in Cape May, N. J.

The contract for building a new station and round-house in Stoneham, Mass., has been awarded by the Boston & Maine, and work on the structures will shortly be commenced.

The contract for building the machine shops of the Mobile & Birmingham at Selma, Ala., has been awarded to W. S. Foster, of Mobile. The building is to be of wood, with iron roof, and will be 50 ft. x 100 ft. The new shops will employ about 50 men.

The San Francisco Ferry House.

The Board of Harbor Commissioners of California have employed an expert to ascertain whether the plans for the great ferry depot at San Francisco, on the foundations for which the state has already expended over $400,000, cannot be modified so that the cost of the entire structure will come within the $600,000 originally figured on, and also give California iron manufacturers more of a chance to get contracts for materials. The idea is to reduce the weight of the materials to be used and thus the cost.

Iron and Steel Prices.

The following, taken from *Bradstreet's* for Saturday, Sept. 21, shows the recent changes in the iron and steel market.

"The following table shows the average prices of Bessemer pig iron, billets and rails per gross ton at Pittsburgh during the past five years:"

Years.	Bessemer Pig iron.	Bessemer Billets.	Bessemer Rails.
1890	$18.85	$30.32	$31.75
1891	15.95	25.32	9.92
1892	14.37	23.63	30.00
1893	12.87	20.44	28.12
1894	11.38	16 58	24.00

"While the steel rail trade is by far the largest single factor in the iron and steel industry, its importance is relatively much less now than it was ten years ago. While the production of Bessemer steel has increased rapidly, all of the increased output has been absorbed by the steadily growing demand for miscellaneous forms of steel. Instead of keeping pace with the increase in the total production of Bessemer steel, the output of rails has declined largely in the past seven years. The following table gives the production of Bessemer steel ingots and the output of Bessemer steel rails during the past 10 years, and shows the decreasing percentage of ingots used for the manufacture of rails:

Years.	Gross tons. Bessemer steel ingots.	Bessemer steel rails.
1885	1,519,430	959,471
1886	2,269,190	1,574,703
1887	2,936,033	2,101,904
1888	2,511,161	1,386,277
1889	2,930 204	1,510,067
1890	3,688,871	1,867,837
891	3,247,417	1,293,053
1892	4,168,435	1,537,588
1893	3,215,686	1,129,400
1894	3,571,313	1,016,013

"In 1887, the year of the largest production, the output of Bessemer steel rails was equal [illegible] per cent. of the quantity of ingots produced, while [illegible] the tonnage of rails was only 28 per cent. of the [illegible]n of ingots This comparison is not exact, as [illegible]llowance for waste in manufacture would m[illegible]portion of ingots rolled into rails slightly lar[illegible] shown above, but this would not alter the r[illegible]ase.

"By what appears to be [illegible]ng more than a mere coincidence the price of steel rails has also been advanced in England simultaneously with the increase here. The British manufacturers have added 10s. per ton to their price, which is now £4 per ton f. o. b. ship. This advance deprives American railroads of the alternative of going abroad for rails, for the manufacturers here and in England are practically upon an even footing at the seaboard of this country. The new price of £4 per ton in England is equivalent to $19.46, to which should be added $7.84 for duty and about $1.50 for freight and other expenses, making the cost laid down in New York about $28.80 per ton, as compared with $28.75 for American rails at tidewater. This practically shuts out foreign rails, as in delivery at any inland point there is a large advantage in favor of American manufacturers in the matter of freight charges. At the gulf ports, which English rails often can reach at nominal freight rates on steamers coming for cotton, as compared with a long and expensive railroad haul from American mills, it would appear that foreign rail manufacturers have a considerable advantage under existing prices. It has been the custom, however, for the combination of American rail makers to permit its members to meet foreign prices at gulf ports without regard to the rates fixed for other sections of the country."

The Simplon Tunnel.

It is announced from Berne that the Italian Government has favorably received the propositions of the Swiss Federal Council, concerning the construction of the Simplon tunnel, in accordance with the designs and propositions of Messrs. Brandau & Co., of Hamburg. An international agreement will be arrived at, and it is expected that before the beginning of next year matters will be in shape to commence work. It is to be understood that Italy will take no direct part in the enterprise. That country will limit its action to connecting the Italian system of railroads with the tunnel, which will in itself be a pretty expensive operation. A very thorough description, with illustrations of this project, appeared in the *Railroad Gazette* of Dec. 28, 1894.

Fall in the Price of Iron.

The spasmodic and rapid advance which has characterized the price of iron and steel for the past two months has been, as we have before said, of an unhealthy nature. It is therefore not a matter of great surprise that a reaction has occurred from the present high prices. At Pittsburgh, on Sept. 18, Bessemer steel dropped 50 cents per ton, while billets fell from 25 to 50 cents a ton. The fall is not particularly great, but in the face of the present upward tendency of prices it is significant. Even during a time of financial and commercial improvement, an unhealthy and excessive rise in the price of any commodity is exceedingly likely to be followed by a reaction when the unhealthy nature of the rise is appreciated. Should the coke strike, which has seemed probable, become general, a further decline may not occur.

The Cable to Hayti.

The United States & Hayti Cable Co. has chartered the cable steamer Mackay-Bennett, owned by the Commercial Cable Co., for the purpose of laying the first section of the submarine cable between New York and Hayti. Work was begun upon the line about a week ago, about 10 knots of cable being laid from the shore end. The cable terminates near the Commercial Company's landing at Coney Island. It will be completed to Hayti as soon as possible. The establishment of the new line will, in all probability, induce competition which should lower the rates for cable messages between the two points. The Board of Directors of the company are John W. Mackay, George G. Ward, J. W. Mackay, Jr., A. B. Chandler and Albert Beck.

American Built War Ships for Japan.

Press reports state that the Japanese Cabinet has practically decided to have four ships for the new Japanese navy constructed in the United States. Mr. William E. Curtis, who recently arrived at San Francisco from Japan, is quoted as having said that the Union Iron Works, of San Francisco, will probably get an order for one battle ship and one cruiser, and that the Cramps will receive a like order. However much truth there may be in this report, it is certain that Americans are in Japan after contracts with a strong probability of their being secured.

The Pelton Water Wheel.

The September issue of the *Journal of the Franklin Institute* contains a valuable paper on the Pelton water wheel. It is the report of the Committee on Science and the Arts, and is a document of 37 pages. Incidentally a good deal of historical matter is given.

Boston Subway Bids.

The advertisement for bids for constructing Section 2 of the Boston Subway, which is principally the station at Boylston and Tremont streets, resulted as follows. The bids were taken under advisement.

	Stone.	Concrete.	Combined.
Met. Construction Co.	$179,565	$178 165	$175,515
H. P. Nawn	176,800	175,460	174,150
R. A. Malone	168,025	165,925	163,325
Woodbury & Leighton	153,510	149,310	146,710
Jones & Meehan	142,585	143 285	139,285
J. F. Dolan & Co.	142,425	129,475	127,075
E. W. Everson	127,700	124,200	121,050

Three amounts were submitted—for construction of stone, concrete, or a combination of the two.

To Limit the Dimensions of Cars.

A meeting of the heads of the mechanical departments of the leading Eastern, Western and Southern railroads was called for Sept. 19 at Chicago by Mr. J. W. Cloud, at the instance of the Central Traffic Association and the Western Freight Association. The meeting was called to discuss the dimensions of cars and to make an effort to standardize them, or rather, to limit them. This matter has been up in the traffic and transportation departments for some time, and now the mechanical officers are asked to help settle it. In response to the call for the meeting the following gentlemen were present: G. W. Rhodes, Superintendent of Motive Power, C., B. & Q.; John Hickey, Superintendent of Motive Power, Northern Pacific; J. N. Barr, Superintendent of Motive Power, C., M. & St. P.; E. D. Bronner, Master Car Builder, Mich. Cent.; S. A. Crone, Assistant Superintendent Rolling Stock, New York Central; F. Rearden, Superintendent Locomotive and Car Department, Missouri Pacific system; E. W. Grieves, Superintendent Car Department,

B. & O.; J. W. Cloud, Secretary, Master Car Builders' Association.

The entire day was spent in discussing the subject before the meeting, but it was all in the nature of preliminary work. A committee was appointed, consisting of Messrs. J. N. Barr, G. W. Rhodes and J. W. Cloud, to formulate a circular of inquiry to all the railroads and private car lines of the country asking for information as to dimensions of cars inside and outside, their capacities, their light weights, their cost of construction, etc., and also as to tunnel clearances, etc. When these data are received another meeting will be called.

The Manufacture of Emery Wheels.

The manufacture of emery wheels, as carried on at the Sterling Emery Wheel Manufacturing Co.'s works at Tiffin, O., is interesting as showing the completeness and rapidity with which raw material can be transferred into a manufactured product with a minimum of hand labor. The emery is received in car lots, and elevated to bins, from which it is drawn through spouts to the mixing room, where it is mixed, and the wheels molded by machinery. Thence they are carried to the drying room and dried, and are then turned to size and again dried. When thoroughly dry they are baked in ovens, the process requiring from four to five days They are then "trued" in the machine room, after which they are ready for use. Every wheel is tested to double the capacity to which it is intended to run before being sent out. A special kind of wheel made of corundum for running either wet or dry is made from selected material.

THE SCRAP HEAP.

Notes.

A passenger train of the Wisconsin Central was stopped by robbers near Waupaca, Wis., on the night of Sept. 19, the engine and baggage car being derailed. Twelve sticks of dynamite were exploded on the express messenger's safe, but without avail, and the robbers fled without securing any booty.

Electro-pneumatic interlocking is being put in at the important junctions at the Y west of the Schuylkill River at Philadelphia on the Pennsylvania Railroad, where the line to the Broad Street Station connects with the north and south line from the New York Division to the Philadelphia, Wilmington & Baltimore road. Pneumatic interlocking is already in use at the Broad Street Station.

Of the half-dozen machines for dumping whole carloads of coal, which have been built at Lake Erie ports during the past summer, one is now in operation, that of the New York, Pennsylvania & Ohio, at its Cleveland dock. On Sept. 19 this machine unloaded 58 cars (1,200 tons) in 4⅓ hours, including a delay of 25 minutes. Forty-five cars were unloaded in three hours. This is more than twice as fast as the best work ever done by the ordinary methods.

The Baltimore & Ohio is preparing to extend the electrical equipment of the Baltimore tunnel, so that the electric locomotive can assist heavy trains as far as the top of the grade, some distance north of the north end of the tunnel. The power wire will also be extended southward from the tunnel, probably as far as Carroll switch. A train weighing 1,222 tons, including the electric locomotive, was recently stopped in the tunnel on a 42-ft. grade, and was successfully started by the electric motor. The reports say that this was done without taking advantage of the slack between the cars. The train was moved 4 ft. in 10 seconds, 20 ft. in 20 seconds, 150 ft. in 40 seconds, and 450 ft. in the first minute. The second electric motor is expected to be ready about Oct. 15.

The scheme for abolishing a large number of grade crossings in East Boston, which has been under discussion for many months, has now been so far completed, on paper, that the city solicitor has filed a petition in the Superior Court asking to have the plan carried out; but it is so costly that there would seem to be some doubt whether it will be successful. The total estimated cost of the changes is over $1,660,000, and the Boston & Maine and the Boston & Albany threaten to abandon their East Boston branches if the changes are ordered. The Boston, Revere Beach & Lynn would also be put to great expense. The two first named roads do little or no passenger business at East Boston. The Boston & Maine could transfer its business to the Mystic freight terminals, and it is said that the Boston & Albany might get along without its East Boston grain shipping facilities by developing water front lands which it owns in South Boston.

Loading freight trains on a tonnage basis was the subject of a paper by Mr. W. H. Voorhies, Assistant Superintendent of the Iowa Central, at the August meeting of the Peoria Division of the Central Association of Railroad Officers. Mr. Voorhies says that since adopting this basis he has handled from 25 to 35 per cent. more cars, without any corresponding increase in expenses, and this in the face of the fact that small cars are being constantly retired. The Iowa Central began this plan early in 1893. Mr. Voorhies believes it best to make but a single rating for engines, one based on a good track, and then allow the chief dispatcher to reduce the loads according to his own judgment whenever the weather makes a reduction necessary. Iowa Central enginemen are authorized to refuse cars whenever the conditions are adverse and the dispatcher cannot be communicated with, the runner being held responsible in each case, by a written order, which he gives to the conductor and which is returned to the Superintendent.

A novel highway crossing signal is in use on the Smith Street & Coney Island Electric Railroad where it crosses the Boulevard, Coney Island, Brooklyn, N. Y., to warn wheelmen and vehicle drivers that a car is approaching. The signals are three electric lights over the driveway and two electric lights over the bicycle path, all with red globes. When the approaching car is some distance away it passes over a small switchboard, which rings a gong notifying the motorman to bring the car to a full stop, and causes the lights to burn for five seconds. The motormen are much pleased. The signals on the darkest and most foggy night can be seen up the Boulevard half a mile. We give these facts on the authority of the New York *Times*, whose railroad editor seems to be off a good deal of the time. If, when he returns, he will get a patent on that red light that can be seen a half mile on the most foggy night his fortune is assured. Aside from this wonder, we do not exactly see the value of the arrangement described. The lights warn you to avoid the car, if you happen to look during the five seconds that they are aglow—but then the car avoids you.

The Atlanta Exhibition.

The account of the Atlanta Exhibition, published last week, described the exhibits made by railroad companies, and some of the rolling stock exhibits. In addition to those mentioned last week the following exhibits have been installed in the Transportation Department:

The Q. & C. Co. exhibits ties with the Servis tie plate that have been taken from roads in the South in order to show the value of the Servis tie plate more especially for roads in that section. Also several of its metal cold cutting machines. Servis tie plates have been placed in the track where the Pullman cars stand.

The Safety Car Heating & Lighting Co. exhibits a number of Pintsch lamps in operation inside of the Transportation Building, and also a number of passenger cars lighted by that system. In the Lake there is a large gas buoy (such as is used by the Light House Board) in full operation. A large number of the company's steam heating devices are exhibited also.

The Ramapo Iron Works, of Hilburn, N. Y., makes a large exhibit and one of the most complete ever prepared by the company. It consists of the standard switches, frogs, automatic switchstands, tripods, etc., and a large assortment of photographs. Working models of all these appliances, one-quarter full size, are an interesting feature of the exhibit.

McKee, Fuller & Co., of Catasauqua, Pa., exhibit three steel tired wheels 28 in., 30 in. and 33 in. in diameter for engine trucks, 36 in. double plate steel tired wheels for tender trucks, and passenger cars, and a 33 in. wheel with worn steel tires. Two 18-inch chilled iron self-oiling wheels with and without caps, for use in ore and coal mines, are also shown.

The Rogers Locomotive Co., of Paterson, N. J., exhibits three engines. One is a ten-wheel passenger engine (built for the Louisville & Nashville), cylinders 19½ in. × 26 in., drivers 69 in. diameter, Belpaire boiler, weight about 135,000 lbs.; one ten-wheel passenger engine (for Plant System), cylinders 20 in. × 24 in., drivers 72 in. diameter, boiler extended wagon top, radial stay pattern, weight about 150,000 lbs.; one eight-wheel passenger engine (for Florida Central & Peninsular), cylinders 18 in. × 24 in., drivers 69 in. diameter, boiler extended wagon top, radial stay pattern, weight about 104,000 lbs.

The St. Charles Car Co. exhibits two cars, one a refrigerator car, out of a lot built for the Kansas City Refrigerator Car Co., and with the most recent refrigerator improvements. The second car is a ventilated fruit car, one of a number built for the Atlanta & West Point. It is constructed of Georgia long leaf yellow pine, and equipped with the M. C. B. automatic couplers and air-brakes. These cars were not specially built for exhibition purposes, but are similar to the others built on the same orders and are to go into regular service when the exhibition is closed. They are good types of well designed cars, in which the best material has been used.

The Johnson Co., of Johnstown, Pa., shows motor car trucks, rails, etc.; the Sterlingworth Railway Supply Co., steel brakebeams, and L. S. Manning, of San Francisco, a car coupler and a model of a recently patented vestibule.

Electric Railroads in Ohio.

Work upon the new Wellston & Jackson Belt Railway, in Ohio, is progressing rapidly. The grading is about three-fourths completed and one mile of rails has been laid. The Chicago Installation Co. received the contract to put in the power plant and furnish motors for the cars. This road is to carry both freight and passengers and was described in these columns a few weeks ago.

Evening Technical Classes.

The Young Men's Institute, at 222 Bowery, New York City, will open its evening classes in technical subjects, Oct. 1. For many years this Institute has conducted a class in steam engineering, under the instruction of a competent mechanical engineer, and there are also classes in architectural and free hand drawing, carriage drafting and electricity.

Railroads in China.

A Washington dispatch says that information has been received that the Chinese Government is preparing to build a railroad from Chin Kiang northerly to Tien Tsin, a distance of 700 miles. The road will be built, owned and controlled by the Chinese Government, and contracts will not be let outside of the country for the construction. So many stories of railroad building in China have been published within the last four or five years, and so very few of them have been true, that we receive this one with great caution, and would advise the reader to look upon it for the present as a mere rumor.

Track Elevation at New Brunswick.

The Pennsylvania intends in the near future to build a superstructure for the two additional tracks across the Raritan River, their present structure being double-tracked. This structure is now being renewed, new material being put in throughout. The report that a new bridge has been commenced is absurd.

The Doncaster Races and the Railroads.

On Wednesday last between the hours of 3:30 and 11 o'clock at night 161 ordinary and special trains had to be despatched to all parts of the country. The Great Northern took the lion's share, chartering no fewer than 56, while the Manchester, Sheffield & Lincolnshire was responsible for the working of 42. The other companies who claimed a share of the traffic were the Midland, Lancashire & Yorkshire, North-Eastern, Great Eastern, Great Western and the London & North Western. The ordinary trains were despatched from the two platforms, 40 leaving the "up platform" and 39 the "down platform." The locomotive sidings were made to do duty for 38 special trains. The goods sidings accommodated 14 specials. From the Shakespeare sidings, which are entered from the Balby Road, 17 specials were despatched. The Manchester, Sheffield & Lincolnshire made the St. James' Bridge sidings busy, chartering 16 trains between 5:40 and 8:13 p m.—*Herapaths.*

Collision in Germany.

Twelve soldiers were killed and 60 injured by a collision of a special train with a freight at Oederan, Saxony, on the evening of Sept. 19. Five cars of the military train were wrecked and two of the freight.

Free Newspapers for Passengers.

It is reported from Chicago that the Chicago Great Western will introduce on its limited trains between Chicago and Minneapolis, something of a novelty in the shape of free papers and periodicals for the passengers. Copies of six daily papers, three illustrated weeklies and eight monthly magazines will be placed at the disposal of the passengers, and they will be permitted to retain the daily papers. No charge will be made for any of the publications, and they will be furnished by the porter to any passenger upon application.

Lake Notes.

The new Sault Canal on the Canadian side has proved very successful. In eight hours of one day it has handled 42 large vessels. It has been filled in four minutes and emptied in four and a half, each operation requiring the removal of over 8½ million gallons of water. The canal has entirely relieved the pressure on the American lock.

There has been a steady advance in lake freights in the last few weeks and they are now better, so far as Lake Superior is concerned, than since 1889. All the early part of this season ore was 80 cents a ton from the head of Lake Superior and 45 cents from Escanaba to Lake Erie ports. On Aug. 27 the rate from Duluth reached $1, and it is now $1.25. Large orders have been made for October and November at $1.40. Freight on wheat from Duluth to Buffalo, which in July was 2 cents, is 3½ cents at present, with 5 to 8 cents predicted on late cargoes; lumber, which was $1.42, is $2.50; and other freights have advanced proportionately. As the vessels in the ore trade are more than twice the capacity of 1888 a dollar freight means more to-day than $1.50 would have meant six or seven years ago. The demand for tonnage is exceedingly strong. Ore cannot be got forward fast enough to suit the consumers. Coal is short at western distributing points. It is likely that all lake shipyards will be full of work the coming winter at satisfactory prices. It is now estimated there will be at least a million tons of freight awaiting movement this fall that cannot be carried, because of a shortage of vessels and high rates. This will be chiefly ore, wheat and lumber.

Receipts of wheat at Minneapolis and Duluth are now heavy. The Northern Pacific has 20 train crews operating on the 150 miles of line directly west from Duluth, and the Great Northern about the same. There is room at Duluth and Superior for about 26,000,000 bushels of grain, besides mill elevators, and it now looks as if the elevators would be nearly empty at the close of navigation, so rapidly is the wheat going forward.

Considerable wheat is being shipped from Duluth to Chicago at this time, the amount already sent over this unusual route being estimated at 1,500,000 bushels.

In a race from the Sault Canal to Ashland, 400 miles, by the steel ships Curry and Merida, last Saturday, the Curry made the distance at the rate of 18.26 miles an hour.

The new steel ship Zenith City took from a Duluth elevator her first cargo the other day, loading 138,000 bushels of wheat, or 4,182 tons. The vessel drew only 14.2 ft. of water, with .4 more aft for coal. The wood vessel Aurania, which also loaded out her first cargo at Duluth the same week, carried 4,400 net tons of iron ore. These are the largest cargoes ever carried out of Lake Superior.

Contracts have been let by the Duluth & Iron Range road for the dredging of all its dock front at Duluth to the depth of 21 ft., to be in readiness for the deep water of the 21-ft. channel, when completed in 1896. This is the first action by any dock owner on the lakes looking toward the deep channels that are to be the controlling factor in lake navigation next season.

The yards of the American Steel Barge Co., at Superior, Wis., will this winter build at least two vessels and probably more.

Electric Railroads Near Cleveland.

Great activity exists in the vicinity of Cleveland O., in the construction of electric railroads. About 65 miles of track have been completed and at least 90 miles are projected Two lines of considerable length are well under way and will be in operation within a few weeks. One of these, known as the A. B. C. line, or the Akron, Bedford & Cleveland, is about 35 miles long, and runs from Akron to Cleveland through a busy and well populated section. Akron has about 30,000 inhabitants, and the new line runs through a number of populous suburbs. This line will come into direct competition with two steam lines, it being proposed to make the round trip rate $1 as against the $1.40 rate now charged by the steam roads. It is said that this road will transport milk on the early morning trains from the outlying country to the city.

The second of these lines is from Cleveland to Elyria, about 30 miles through a populous district. The line will probably not have so much freight traffic as the one just described, but its passenger traffic is likely to be good. Another line projected runs from Cleveland to Wooster, passing through Medina. The road would, it is supposed, have a large traffic in fruit and garden truck, and its passenger traffic would at the same time be considerable. Both of these towns are county seats and they are each about 40 miles from Cleveland in a direct line. Another of the projected lines, about 40 miles long, is expected to extend from Cleveland southeast to Burton, in Geauga County. This section is not now well opened up, it being reached by a roundabout trip of about 65 miles.

Still a third line is projected from Cleveland to Lorain on the shores of Lake Erie, about 30 miles west of Cleveland. The recent removal of the Johnson Company's works to Lorain has made that place one of considerable and growing importance. The cities are connected by a steam road and by a steamboat line during the summer.

In addition to these lines a number of extensions have been made during the summer by the street railroads of the city. There is some indication that the Cleveland Electric Railway Co. will extend its lines to Painesville,

about 30 miles east of the city, next spring. Only 17 miles would have to be built from the present terminus of the company's lines to reach Painesville.

LOCOMOTIVE BUILDING.

Eight new class R freight engines were turned out of the Altoona shops last week. They will be used on the New York and Philadelphia divisions. The shops have orders for 750 new freight cars.

CAR BUILDING.

The Madison Car Co. is building 500 coal cars for the Missouri, Kansas & Texas, to be equipped with the Buckeye car coupler.

The Philadelphia & Reading received last week the first consignment of the 1,000 hopper coal cars now being built by the Pullman Car Co. It is expected that the new equipment will be delivered at the rate of 70 cars a week.

BRIDGE BUILDING.

Cleveland, Akron & Columbus.—The Youngstown Bridge Co. is to have completed by November 1 four new steel bridges for this road. One 510 ft. long of three spans, at Brink Haven; two spans of 160 ft. each, near Gambier; a single span of 170 ft., near Mt. Vernon, and a single span of 165 ft., north of Sunbury.

Hamilton, Ont.—Sealed tenders will be received until Oct. 15 for the superstructure of a highway swing bridge over the Burlington Channel, near Hamilton, according to plans and specifications to be seen at the Custom House, Hamilton, and the Department of Public Works, Ottawa.

Latrobe, Pa.—The contract for the superstructure of a new iron bridge to span the Loyalhanna creek, near Latrobe, has been awarded to Nelson & Buchanan, of Chambersburg, Pa., for $6,700.

New York City.—The Engineers' Office of the new East River Bridge is now established at No. 392 Kent avenue, Brooklyn. Official communications should be sent to Mr. L. L. Buck, Chief Engineer, at that address.

A decision was recently made by Vice-Chancellor Emery, of the Chancery Court, in Newark, which has an important bearing on the construction of the New York & New Jersey bridge. The work of building the foundation on the Hoboken side was begun some time ago, but certain persons living in the vicinity of the work obtained a preliminary injunction against the work on the plea that the digging for the foundations and the use of steam-pumps, etc., was a nuisance. The result was a legal contest, which has recently been decided in favor of the bridge company. The company maintained that it, being a Federal corporation, required no legislation from the states of New Jersey and New York for the construction of its bridge. This contention was upheld by the decision of Vice-Chancellor Emery, who held that the Federal Courts had exclusive jurisdiction, and that concurrent jurisdiction of state courts was excluded.

Niagara Falls, N. Y.—The contract for the stone abutments for the 840 ft. steel arch which Mr. L. L. Buck has designed to replace the upper suspension bridge over the Niagara gorge, has been let to B. P. Smith, of Rochester. The stone work is to be begun at once, but the steel work will certainly not be begun before next spring, and possibly later.

Stapleton, N. Y.—Sealed bids will be received by the Supervisors at Stapleton, S. I., until Oct. 4, for the material for the erection of a masonry, steel and brick highway bridge in the town of Castleton. Plans and specifications can be obtained from the Engineer of County Roads at Stapleton. Alternative bids will also be received for a steel structure in place of the masonry bridge, such bids to be accompanied by plans and specifications.

Revelstoke, B. C.—Preparations are being made by the Canadian Pacific Railroad for the erection of a new bridge across the Columbia River at this point, and it is expected that the work will be completed during the coming winter. The new structure will be a wooden one, similar to the bridge at present in use, which is the longest wooden bridge on the road, measuring over three-quarters of a mile.

RAILROAD LAW—NOTES OF DECISIONS.

Carriers of Goods and Injuries to Property.

In Texas it is held that a common carrier is not liable, as a trespasser, to the owner of merchandise which it has refused to receive, as being badly packed, and which is destroyed, without negligence on its part, while being separated by it from other freight with which it has been improperly mixed, and which it is such carrier's duty to transport.[1]

In Minnesota a traffic association issued a through bill of lading for flour from Minneapolis to Boston, containing a stipulation that in case of loss, detriment or damage, the carrier alone should be liable in whose actual custody it should be at the time of the loss. The Supreme Court rules that the shipper was entitled to an uninterrupted and continuous transportation from Minneapolis to Boston, and that the carrier who had transported the freight to a point where another was to assume custody and control became a guarantor or surety that the latter would receive it, and was liable as an actual custodian, where the connecting carrier unreasonably neglected or refused to receive it.[2]

In New York it is held that a carrier cannot relieve itself from liability for negligence in placing fruit in a common box car for transportation, when the temperature was below freezing, by the mere fact that its shipping clerk, when the shipping receipt was presented for signature, struck out the words "refrigerator car," stamped on its face, and wrote "not to be loaded in a refrigerator car," and then signed the receipt.[3]

In Iowa it is held by the Supreme Court that a car furnished by a railroad for the transportation of horses and mules, which is liable to be broken from slight kicks by the animals, is not reasonably safe, and the shipper may recover for injuries to the animals caused by the car being so broken.[4]

In New York it is laid down that one day is a reasonable time to unload, and remove to a distance of one mile, 63 bales of hops, so as to change the carrier's liability to that of a warehouseman, where the consignee has sufficient drays available to effect the removal.[5]

In Kansas where fire, negligently allowed to escape from defendant's locomotive when the weather was dry and windy, spread continuously to plaintiff's property, though 10 miles away, the injury was not so remote, or the result of such a mere possibility, as to release defendant from liability.[6]

In the Federal Court defendant shipped a car load of oil in a car which had no valve regulating the flow of oil. The consignee, with knowledge that the car was leaking, attempted to draw off the oil near plaintiff's mill, the engine room of which was lower than the track. Owing to the absence of the valve, the oil ran into plaintiff's engine room, exploded, and destroyed the mill. It is held that defendant was not liable therefore since its negligence was not the proximate cause of the injury.[7]

In Indiana the negligence of a railroad company in setting fire to dry grass on its right of way is the proximate cause of a loss by the fire spreading to plaintiff's farm, though other farms intervened between the place where the fire started and his farm.[8]

In Missouri if a cattle guard is ordinarily sufficient to turn stock, and a horse jumps over it and passes onto a track where it has no right to be, and is then struck and killed, the railroad is not liable therefor.[9]

In Texas a herd of horses crossed defendant's track in front of a train running 30 miles an hour, on a down grade, with brakes partially set, and one of them, which ran out from behind a hedge some 20 steps from the track, and jumped before the engine in an attempt to overtake the herd, 20 ft. ahead of him, was killed. The engineer was letting off steam to frighten the horses, and thought all had passed, the hedge hiding the last from sight. It is held that there was no negligence on the part of the trainmen.[10]

In South Dakota it is held that trainmen of a railroad are not required to be on the lookout for trespassing animals on its track, other than at public crossings.[11]

Injuries to Passengers, Employees and Strangers.

In New York the right of a passenger to recover for injuries received in leaving a moving train at the direction of the guard is not affected by the fact that the guard was guilty of a misdemeanor in opening the gate to allow plaintiff to alight.[12]

In Texas an approach to a depot on premises belonging to the company constitutes a part of such premises, and the relation of carrier and passenger continues until the passenger has passed beyond such approach.[13]

In Missouri it is held that where the brakeman stationed at the brake in the cupola of a caboose car, and so able to see up and down the track, on a signal for brakes, excitedly and recklessly calls to the passengers in the car to "Jump!" "Jump for your lives!" the company is liable for injuries to persons jumping from the moving train, though there is no real danger, and it is not one of the brakeman's duties to warn passengers of danger.[14]

In the Federal Court it is held that where a passenger signs a contract printed on his ticket, stipulating that his ticket shall be void unless countersigned by an agent of the railroad at a certain point, and omits to obtain such countersignature, relying on the statement of the agent that it is unnecessary, he may rightfully be refused passage on the unsigned ticket, and has no right of action if ejected from the train.[15]

In Massachusetts, where one runs to catch a train as it is starting, and is not seen by any of the trainmen, and, without any negligence on their part, is injured while attempting to board it while moving, he is not a passenger, and the company is not liable.[16]

In Texas the Federal Court, where a section hand, engaged at night in taking up and relaying track, was injured in consequence of another workman stumbling and dropping a rail, held that, in view of the nature of the work, this was a risk assumed by the servant, as was a deficiency of light, of which the servant must have been as well aware as the master.[17]

In Illinois it is held that a helper in a switch yard, whose duty is to catch and couple cars in the yard, and who, in the exercise of that duty, goes upon a car at night, just after it has been inspected, and who is killed by reason of a defect in the brake, is not guilty of contributory negligence for failing to inspect the brake before using it, since he has not the same opportunity of inspection as a brakeman.[18]

In Texas, plaintiff was engineer of a northbound train, under orders to pass a train known as "second 101" at S. Upon arriving at S., he found a southbound train on the side track. Relying on the supposition and the statement of another employee of defendant company that this was "second 101," and disregarding a positive order of the company, with which he was familiar, and to which his attention had been recently called by a special bulletin, making it his duty to know absolutely what trains he passed, plaintiff pulled his train out of S., and collided with "second 101." The Supreme Court holds that plaintiff could not recover for injuries thereby caused.[19]

In the Federal Court, an engineer who, to make repairs, goes out on the running board of his locomotive while it is running 17 miles an hour, is guilty of such negligence as will preclude a recovery for his death, caused by being thrown from the engine.[20]

In Masschusetts, A had been employed by defendant as a brakeman for about three months, was competent and intelligent, and had been frequently over and by the switch which knocked him off the car and caused his death. Said switch was in the same condition as when he entered such employment, and had no hidden defects. The Supreme Court holds that he assumed the risk of injury from the proximity of the switch to the track.[21]

In the Federal Court it is decreed that where a brakeman goes between the cars to couple or uncouple them by hand, in obedience to an order of an engineer or conductor, but in violation of a rule prohibiting brakemen from coupling or uncoupling cars except with a coupling stick, he performs an act outside the scope of his employment, and assumes the risk.[22]

In New Hampshire, a brakeman killed, while riding in front of an engine, by a collision with a wagon, caused by failure to maintain gates or signals at a crossing, must be held to have assumed the risk, where he had been employed continuously at that point for three years, and was familiar with the locality and the manner of doing business.[23]

In Pennsylvania passenger train No. 5, when 100 miles from P., was ordered to run to P. two hours late, which would make the time of its arrival at P. 20 minutes earlier than passenger train No. 37, which was then ahead of No. 5, and running on schedule time. Every one connected with the trains knew that such order was to be read in connection with the general rules of the company for the running of trains, and meant that No. 5 should run two hours late and have a track clear of freight trains, but that it must run with reference to the schedule of all passenger trains; and that it required No. 5 to run 10 minutes behind No. 37 to G., and five minutes behind it from there to P. Before reaching P., No. 5 ran into No. 37, whereby a brakeman on No 37 was killed. The Supreme Court holds that the collision was caused by the negligence of the trainmen, and not by an unsafe schedule or defective rules.[24]

In Minnesota the mere fact that a railroad permits persons to walk on its tracks does not render it liable to one injured by a defective "frog."[25]

In Indiana the negligence of a husband who is driving his wife over a railroad crossing, where she is injured, cannot be imputed to the wife.[26]

In Kansas it is held that where detached cars have been left standing for more than an hour across a public street, and the steps and platform of one of them are in line with the street, and a person approaching, who, after using care to discover whether there is danger of the cars moving, and finding none, attempts to cross over the platform and steps of the car and is injured, as a matter of law such person was not guilty of contributory negligence.[27]

The Supreme Court of Texas decides that the fact that a person driving across a railroad does not cross along that part of the street which is planked between the rails of the railroad does not render him guilty of contributory negligence, it not being obviously unsafe to cross at such point, that portion of the street being commonly used by the public, and the cause of his injury being a projecting spike from a railroad tie buried in the sand.[28]

[1] G., C. & S. F. v. Ins. Co., 28 S. W. Rep., 237.
[2] Southard v. Minn., St. P. & S. S. M., N. W. Rep., 442.
[3] Tucker v. Penn. R. R., 30 N. Y. S., 811.
[4] Betts v. Ch., R. I. & P., 60 N. W. Rep., 623.
[5] Brand v. N. J. Steamboat Co., 30 N. Y. S., 903.
[6] C., R. I. & P. Ry. v. McBride, 37 Pac. Rep., 978.
[7] Goodlander Mill Co. v. Standard Oil Co., 63 Fed. Rep., 400.
[8] C. & E. v. Ludington, 38 N. E. Rep., 342.
[9] Jones v. C., B. & K. C. Ry. Co., 1 Mo. App. Rep., 31.
[10] M., K. & T., v. Palmer, 27 S. W. Rep., 859.
[11] Harrison v. C., M. & St. P., 60 N. W. Rep., 405.
[12] Geiler v. M. Ry., 32 N. Y. S., 254.
[13] G. C. & S. F. v. Glenk, 30 S. W. Rep., 278.
[14] McPeak v. M. P., 30 S. W. Rep., 170.
[15] Cent. Trust Co. v. E. T., V. & G., 65 Fed. Rep., 332.
[16] Jones v. B. & M., 39 N. E. Rep., 1019.
[17] G., C. & S. F. v. Jackson, 65 Fed. Rep., 48.
[18] C. & E. I. v. Kneirim, 39 N. E. Rep., 324.
[19] Fritz v. Missouri, K. & T. (Tex. Civ. App.), 30 S. W., 85.
[20] South. Pac. v. Johnson, 64 Fed. Rep., 951.
[21] Goodes v. B. & A., 38 N. E. Rep., 500.
[22] R. & D. v. Finley, 63 Fed. Rep., 228.
[23] Bancroft v. B. & M., 30 Atl. Rep., 409.
[24] Kennedy v. B. & O., 30 Atl. Rep., 1,014.
[25] Akers v. C., St. P., M. & O., 60 N. W. Rep., 669.
[26] L. S. & M. S. v. McIntosh, 38 N. E. Rep., 476.
[27] Weber v. A., T. & S. F., 38 Pac. Rep., 559.
[28] Dillingham v. Fields, 29 S. W. Rep., 214.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chartiers, 3 per cent., payable Oct. 1.

Chicago Junction Railways & Union Stock Yards Co., 1½ per cent. upon the preferred stock, payable Oct. 1.

Cincinnati, Hamilton & Dayton, quarterly, 1 per cent., payable Oct. 1.

New York Central & Hudson River, semi-annual, 3½ per cent., payable Sept. 30.

New York, New Haven & Hartford, quarterly, 2 per cent., payable Sept. 30.

Norfolk & Southern, quarterly, 1 per cent. upon the capital stock, payable Oct. 10.

Pittsburgh, Youngstown & Ashtabula, 3½ per cent. on the preferred stock, payable Sept. 20.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Chesapeake & Ohio, annual, Richmond. Va., Oct. 22.

Minneapolis & St. Louis, annual, Minneapolis, Oct. 1.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *American International Association of Railroad Superintendents of Bridges and Buildings* will hold its annual meeting at New Orleans, La., Oct. 15.

The *American Street Railway Association* will hold its annual meeting at the Windsor Hotel, Montreal, Oct. 15 to 18.

The *Roadmaste s' Association of America* will hold its annual meeting at St. Louis, Mo., Oct. 15, 16 and 17.

The *American Railway Association* will hold its fall meeting at New York City, Oct. 16.

The Engineers' and Architects' Association of Southern California meets each third Wednesday of the month in the Hall of the Chamber of Commerce, Los Angeles, Cal.

The Engineers' Society of Western New York holds regular meetings the first Monday in each month, except in the months of July and August, at the Buffalo Library Building.

The *Western Railway Club* meets in Chicago on the third Tuesday of each month, at 2 p m.

The *New York Railroad Club* meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m.

The *New England Railroad Club* meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Wednesday of each month.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 2 p. m.

The *Southern and Southwestern Railway Club* meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The *Northwestern Railroad Club* meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, at 8 p. m.

The *Northwestern Track and Bridge Association* meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

The *American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The *Western Society of Engineers* meets on the first Tuesday in each month, at 8 p. m. The headquarters of the society are at 1736-1739 Monadnock Block, Chicago. The business meetings are held on the first Wednesday at its rooms. The meetings for the reading and discussion of papers are held on the third Wednesday at the Armour Institute, Thirty-third street and Armour avenue.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

The *Boston Society of Civil Engineers* meets at Wesleyan Hall, 36 Bromfield street, Boston, on the third Wednesday in each month, at 7.30 p. m.

The *Engineers' Club of St. Louis* meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The As-

sociation headquarters are at The Cumberland Publishing House, Nashville. Tenn.

The *Engineers' Society of Western Pennsylvania* meets in the Carnegie Library Building, Allegheny, Pa., on the third Tuesday in each month, at 7.30 p. m.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Association of Engineers of Virginia* holds informal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at - p. m.

The *Denver Society of Civil Engineers* meets at 36 Jacobson Block, Denver, Col., on the second and fourth Tuesdays of each month except during July, August and December when they are held on the second Tuesday only.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7.30 p. m.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Engineers' Club of Cincinnati* meets at the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati, O., on the third Thursday in each month, at 7.30 p. m. Address P. O. Box 333.

The *Engineers' and Architects' Club of Louisville* meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday each month at 8 p. m

The *Western Foundrymen's Association* meets in the Great Northern Hotel, Chicago, on the third Wednesday of each month. B. W. Gardner, Monadnock Block, Chicago, is secretary of the association.

The *Association of Civil Engineers of Cornell University* meets on Friday of each week at 2:30 p. m., from October to May, inclusive, at its association rooms in Lincoln Hall. Ithaca, N. Y.

American Street Railway Association.

Special committees will report on the following subjects at the annual convention to be held in Montreal, Que., Oct. 15, 16 and 17: "Transfers," "Municipal Ordinances," "Labor Question. Wages Paid to Employees," "Experience of Roads in Furnishing Free Music and other Entertainments to the Public," and "Physical Operation of Roads."

Boston Society of Civil Engineers.

The first of the fall meetings of the society was held at the rooms of the club, at Wesleyan Hall, Boston, on Sept. 18. Percy H. Kenway read a paper on Heating and Ventilating Plants in the Suffolk County Court House and the Massachusetts State House. In the afternoon the members of the society visited the new high service reservoir at Cambridge.

Michigan Engineering Society.

The following officers have been elected for the ensuing year: President, George L. Wells, St. Louis; Secretary and Treasurer, F. Hodgman, Climax; Vice-Presidents, Frank F. Rogers, Port Huron; Board of Directors, Doer Skeels, Grand Rapids; W. B. Sears, Saginaw; William Appleton, Lansing. The next annual meeting will be held in Saginaw, Mich., the first Tuesday of January, 1896.

Western Society of Engineers.

A meeting of the society was held at the Armour Institute, at Chicago, Sept. 24, the regular meeting of Sept. 4 having been adjourned to that date. Mr. A. V. Powell was to read a paper on the Dry Docks of the Great Lakes. The result of the recent letter ballot on the proposed withdrawal of the society from the Association of Engineering Societies was to be announced.

Central Railway Club.

The meetings of this club have been resumed, the September meeting being held at the Hotel Iroquois, Buffalo, on Sept. 14, at 2 p. m., the time of meeting having been changed from the morning hour. President Samuel Higgins, of the Lehigh Valley, made an address, in which he referred to the proceedings of the Master Car Builders' and Master Mechanics' conventions, and suggested that the club might find in the matters brought before those conventions, important subjects for discussion at future meetings. He thought that the Chicago agreement in regard to Interchange Rules, the recommendation for a standard truck for 60,000 lb. cars, the design of high speed locomotives to reduce the weight of reciprocating parts, economies in shop practice and standard specifications for boiler tubes, were all subjects of interest on which the conventions had not taken final action, and which it was desirable to have fully discussed at the railroad clubs.

The President was authorized to appoint a committee of three to meet with similar committees from the other railroad clubs at Pittsburgh on Nov. 14, to formulate amendments to the present M. C. B. Rules of Interchange. The new rules as adopted by this joint committee are to be reported by the Arbitration Committee to the M. C. B. Association, and then submitted to the members at the next convention. A. M. Waitt, E. D. Bronner and T. Sutherland form the committee from the Central Railway Club.

Mr. E. D. Bronner, of the Michigan Central, submitted a long report from a special committee on the management of steam heat in passenger cars. The committee suggested the following questions for discussion at the club:

1—Maximum pressure to be allowed in blowing out train pipe?

2—Maximum pressure permitted to be carried while trains are running?

3—Can better results be obtained with steam heat if sleepers are carried at front or rear of trains?

4—Should crews have entire charge and responsibility of heating apparatus on trains, or divide it with porters?

5—How should temperature be regulated?

6—A steam trap is clearly not necessary in heating trains by steam. Is it advisable?

The subject was continued without action until the next meeting.

R. S. Miller, from the committee on "Comparative service derived from flues in locomotive boilers working with a steam pressure of 125 to 140 lbs., when boiler is carrying 160 to 200 lbs." presented a report which reached the following conclusion based on reported experience:

"Your committee believe that with boilers free from mud and sediment, clean especially around the flues, and of sufficient capacity to maintain a certain pressure at all times, regardless of the service of the engine, with exhaust nozzle of proper size and other draft fixtures properly arranged, we would have but little trouble with flues, no matter what pressure of steam was carried."

The report will be discussed at the November meeting of the club. At that meeting the Standard Height of Drawbars will also come up for discussion.

Western Railway Club.

The Western Railway Club held its first meeting of the season at the Auditorium Hotel in Chicago, Sept. 17. There was a large attendance of the members, and numerous visitors, among whom was Prof. W. H. Warren, of Sydney, New South Wales, consulting engineer for the government, who is making a visit to this country on business for his government.

Forty new members were admitted at the meeting of the Board of Directors, which preceded the regular club meeting.

The discussion on car heating, based on Mr. McElroy's paper, presented at the May meeting, was opened by Prof. W. F. M. Gass, who read a few remarks he had prepared. In the absence of McElroy, the secretary read his answer.

The experience meeting on the subject of grabirons and drawbar heights followed this, being introduced by a communication from Mr. P. H. Peck, Master Mechanic of the Chicago & Western Indiana Railroad. The uncertainity of the legal requirements was pointed out by several of the members, who wished to know whether the "standard height" of drawbar above rails—34½ in.—meant the maximum or not, the minimum height being mentioned in the law, but no maximum. The question of position of grabiron on the ends of cars was also discussed, Mr. G. N. Barr, of the Chicago, Milwaukee & St. Paul, Mr. J. W. Rhodes, of the Chicago, Burlington & Quincy, and others speaking.

The subject of topical discussion, Exhaust Pipes and Steam Passages, and their relation to the economy of a locomotive, was begun by Mr. E. M. Herr, Assistant Superintendent Motive Power, Chicago & Northwestern Railroad. Mr. Herr exhibited a drawing of their new exhaust nozzle, and spoke of the changes in it from the old type, and of the excellent results that have resulted from its use.

The nozzle has a single tip, the area of which is larger than that of the nozzle at its most contracted place. The bridge is carried up above the contraction some 2½ in. to cause a straighter exhaust of the steam upward, and rid the locomotive of the effect of a crossfire. After a brief discuseion in which Professor Warren gave the results of the use of American and English engines in New South Wales, and Mr. J. C. McConnell, of the Union Pacific, told of the increase of the diameter of the exhaust nozzle-tips he had been compelled to make.

After the intermission, Prof. Storm Bull, of the University of Wisconsin, made a few remarks about his paper on Compound Locomotive Test on the Chicago & Northwestern Railway, which was read by title according to the new rules of the club. This paper comprised a thesis of three of the students of the University who made the tests referred to.

The third annual banquet of the club was held at 6:30 p. m., in the banquet hall of the Auditorium Hotel on the same evening. About 130 members and guests were present. The toasts responded to were as follows: "Our Club," by President Mr. G. L. Potter; "The International Railway Congress of 1895," by Col. H. S. Haines; "Transportation," by Mr. W. F. Merrill; "Electricity as a Motive Power for Surface Railways," by Mr L. B. Stillwell; "The Passenger Agent in Railway Service," by Mr. G. N. Heafford, and "The Press," by Mr. Harry P. Robinson. Mr. A. M. Waitt was toastmaster and performed his duties in an exceptionally apt and graceful manner.

Mr. G. L. Potter, the first speaker, gave a brief history of the progress and development of the club since its organization. He then spoke of the operation of railways during the past financial depression, dwelling on the economics that had been practiced, and the results of which had been surprising to all. He then introduced Mr. Mr. A. M. Waitt, the toastmaster, who introduced each of the remaining speakers with a few well-chosen remarks.

In the speech of Col. H. S. Haines on the International Railway Congress of 1895 he related the experiences of the American delegates in England, and to d also of the feeling of European engineers toward our railway construction and operation. The sentiment there is unfavorable to our railways and nine-tenths of our mileage is looked upon as "light railways" and hardly suitable for feeders for their principal lines. In order that the question of the application of our systems to the parts of their country where the present traffic will not justify the cost of construction and operation in accordance with their recognized standard should be established in the minds of these engineers, Colonel Haines said that previous to the next congress in Paris in 1900 we should have a meeting of the engineers here, and show them what our systems really are. He called upon the Western Railway Club to start the movement necessary to bring about this meeting.

Mr. Merrill, in his speech on "Transportation," showed the effects of a cheap transportation on the civilization, and made the statement that enough meat and bread to supply an adult with food for a year could now be transported from the source of supplies to the consumer for the amount of a day's wages of a workman.

Mr. Stillwell was the next speaker, and told of the flexibility of electricity as a medium for the transmission of power, and of its application to railways in and about cities.

Mr. Heafford followed with a humorous speech on the "Passenger Department in Railway Service."

The last toast was "The Press," and was responded to by Mr. Harry P. Robinson, who spoke of the relations between railroad men and the press in regard to obtaining and circulating correct information, which is necessary to the technical papers.

Several others were called on by the toastmaster for impromptu speeches, among whom were Mr. J. N. Barr, Prof. W. H. Warren and Mr. Clement F. Street.

PERSONAL.

—Mr. J. J. Sullivan has been appointed Treasurer of the Cleveland, Akron & Columbus, to succeed Mr. F. E. Rittman, resigned.

—Mr. W. V. Hawley has been appointed acting General Freight and Passenger Agent of the Findlay, Fort Wayne & Western, vice, Mr. Frank Janes, resigned.

—Mr. C. M. Saffarans, formerly General Agent of the Cleveland, Akron & Columbus Road, at Columbus, O., has been appointed Contracting Agent of the Erie Dispatch in St. Louis.

—Mr. W. B. Rowland has been appointed general agent of the passenger department of the Mobile & Ohio at St. Louis, vice, Mr. F. W. Greene, resigned. Mr. Rowland has been in the auditor's office.

—Mr. G. M. Stewart has been appointed Acting General Manager of the Interoceanic Railroad of Mexico, to succeed Mr. E. W. Jackson, whose death in the City of Mexico, after a short illness, was noted a few weeks ago.

—Mr. E. A. Anderson has been appointed Trainmaster of the Atlanta Division of the Southern Railway, with headquarters at Atlanta, succeeding Mr. Busbee, who has been transferred to the Central Division at Raleigh, N. C. Mr. Anderson has recently been in the office of Superintendent McBee at Atlanta.

—Mr. Paul I. Welles has been appointed Superintendent of the Third Division of the Southern Railway, with headquarters at Columbia, S. C. Mr. Wells has recently been connected with the Long Island road, and was previously connected with the operating department of the Great Northern and Union Pacific lines.

—The appointment of Mr. George R. Peck, recently General Solicitor of the Atchison, Topeka & Santa Fe, to that office on the Chicago, Milwaukee & St. Paul, was formally announced at the recent meeting of stockholders of that company and the appointment of Mr. Burton Harrison as General Counsel of the same company, was also formally announced at the same time.

—Mr. W. J. Walker, Southeastern Freight and Passenger Agent of the Texas & Pacific, having resigned, that office has been abolished. Mr. A. J. DeRussy, Division Freight Agent at New Orleans, will hereafter have direct charge of freight matters in the southeastern territory, and Mr. J. H. Word, Traveling Passenger Agent at Atlanta, will have charge of the traffic matters.

—Mr. Frank Ellmaker, Superintendent of the middle division of the Pennsylvania road, has resigned to accept the superintendency of the Consolidated Traction Company of New Jersey. The position involves complete charge of the operating department of the entire system of the company, which controls the street lines of Jersey City, Newark, Elizabeth and Paterson. Mr. Ellmaker will not sever his connection with the Pennsylvania Railroad until his successor has been appointed.

—Mr. Frank Janes who has recently been appointed General Agent of the Pennsylvania Lines at Toledo, was formerly connected with that company at Toledo as Division Freight Agent. He resigned that office about two years ago to go to Denver, Col., as Commissioner of the Colorado Traffic Association. When his contract with that association expired a few months ago, he returned to Ohio and was appointed General Freight Agent of the Findlay, Fort Wayne & Western. This position he now resigns to go to Toledo.

—The Southern Railway has changed its organization, Col. A. B. Andrews being made First Vice-President of the company, an office which has remained vacant since the organization of the company. Mr. W. H. Baldwin, Jr., heretofore Third Vice-President, is promoted to be Second Vice-President. These are changes of titles, the duties of both officers remaining practically as before, Mr. W. W. Finley, who becomes Third Vice-President, is a new officer of the Southern Railway, and will have charge of its traffic department.

—Col. W. M. Patton has been appointed Professor of Civil Engineering at the Virginia Agricultural and Mechanical College, at Blacksburg, Va. Professor Patton is well known from his writings, and especially for his two books, one on Foundations and the other on Civil Engineering. He has had charge of much difficult engineering work, having had charge of the erection of the Susquehanna River bridge of the Baltimore & Ohio, the Schuylkill River bridge and others. He was also Chief Engineer of the Mobile & Birmingham road.

—Mr. James R. Langdon, Vice-President of the Central Vermont road, and connected with various financial institutions in Vermont, died in Montpelier in that state on Sept. 20. Mr. Langdon was a director of the Burlington & Lamoille road and other companies in Vermont, but his chief railroad interest was in the Central Vermont road. He was one of the most active projectors of that line and is credited with having assured its construction at a critical time in its history by successful negotiations in Boston, which secured subscriptions of over $1,500,000 to the stock of the company.

—Mr. M. P. Hutchinson, President of the Catawissa road, one of the operated lines of the Philadelphia & Reading, and well known in financial circles in Philadelphia, died at Atlantic City last week after a long illness. Mr. Hutchinson had been connected with the Catawissa road practically since its organization, being President of the road for many years. He was the chief complainant in the unsuccessful action recently brought to compel the Philadelphia & Reading, the lessee of the Catawissa road, to pay a larger dividend than the minimum rates stated in the lease, so that the common stockholders would receive some return on their stock, the present rental providing for dividends only on the two preferred stocks.

—Mr. J. C. Wilson, one of the receivers of the Atchison, Topeka & Santa Fe, died suddenly at a hotel in New York City on Sept. 18. Mr. Wilson was appointed Receiver of the Atchison road by Judge Caldwell in December, 1893. His appointment was made at the request of certain Western interests in the property, and he was their special representative in the management of the road, his headquarters being at Topeka, Kan. Mr. Wilson had not previously had experience in railroad matters, but was one of the most widely known men in Kansas. He had been Mayor of Topeka, and had held other important political positions. Judge Caldwell announces that as the receivership is apparently so near its termination no successor to Mr. Wilson will be appointed.

—Colonel Cary A. Wilson, Chief Engineer of the Missouri, Kansas & Texas, died suddenly at New York City last week. He had been in poor health for a long time, and about two weeks ago left Parsons, Kan., his headquarters, for the East in the hope of benefiting his health. Colonel Wilson was formerly Chief Engineer of the East Tennessee, Virginia & Georgia road, but in August, 1892, went West as Chief Engineer of the Missouri, Kansas & Texas and did important work in building new lines for that company, connecting its disjointed divisions and in supervising extensive improvements in maintenance of way. His last important work on the East Tennessee, Virginia & Georgia was in building the Briarfield, Blockton & Brimingham branch in Alabama. Before undertaking that work he had been for a long time Chief Engineer of the Mobile & Birmingham road.

—Mr. W. W. Finley, who resigned the office of Traffic Manager of the Great Northern Railroad a few months ago to become Chairman of the Southern States Passenger Association, has just been appointed Third Vice-President of the Southern Railway. As such he will have charge of the traffic department of the company, relieving President Spencer, who heretofore has had

traffic matters under his immediate supervision, with Sol Haas, Assistant to the President, formerly Traffic Manager of the Richmond & Danville, in charge of the details of the department. Mr. Finley is now about 42 years old, and therefore one of the youngest men in responsible charge of the freight matters of a great railroad. He, however, has had a long and varied experience in traffic matters. He was Assistant General Freight Agent of the Missouri Pacific, the Texas Pacific and other Western railroads until 1889, when he became Chairman of the Trans-Missouri Traffic Association. He was afterward Chairman of the Western Passenger Association of Chicago, and left that association in May, 1892, to go to the Great Northern as General Traffic Manager; that position he held until last April, when he went to Atlanta as Commissioner of the Southern States Passenger Association.

ELECTIONS AND APPOINTMENTS.

Ann Arbor.—This company has been organized to succeed the Toledo, Ann Arbor & North Michigan. The Directors elected are: W. R. Burt, G. W. Quintard, J. E. Simmons, R. M. Galloway, R. C. Martin, C. J. Lawrence, John Jacob Astor, R. D. Murray, Benj. Perkins, E. W. Tolerton, A. C. McClure, A. W. Wright.

Chicago, Milwaukee & St. Paul.—The annual meeting of the stockholders was held at Milwaukee, Sept. 22. The 13 directors were re-elected. There were present at the meeting Roswell Miller, P. D. Armour, of Chicago; Frank S. Bond, Peter Geddes, William Rockefeller, Samuel Spencer and A. Van Santvoord, of New York, and Frederick Layton, of Milwaukee. At the annual meeting of the Directors the old officers were re-elected. The appointments of George R. Peck and Burton Hanson as General Counsel and General Solicitor respectively were formally announced.

Kennebec Central.—At the annual meeting of the stockholders at Gardner, Me., last week, the following officers were elected for the ensuing year: Weston Lewis, President; P. H. Winslow Treasurer; H. S. Webster, Clerk; Weston Lewis, J. S. Maxey, A. C. Stilphen, J. B. Dingley and H. W. Jewett, Director; A. C. Stilphen, Auditor and General Counsel.

Louisville, New Albany & Chicago.—At the annual meeting of the stockholders, at Indianapolis, Sept. 19, 88,158 shares of stock were represented. The following directors were elected to serve for four years: W. L. McDoel, Gilbert Shaw and Edward R. Thomas.

North Carolina.—The following directors were elected at the recent annual meeting: S. B. Alexander, President; W. C. Maxwell, L. S. Overman, J. P. Allison, J. J. Young, C. W. Johnson, F. S. Spruill, V. E. Turner, on the part of the State of North Carolina; and Gen. R. F. Holt, ex-Gov. T. M. Holt, Henry W. Fries and Benehan Cameron, on the part of the private stockholders.

Providence & Stonington Steamship Co.—The annual meeting of the Directors was held at Providence, R. I., Sept. 10. The following Board was re-elected for the ensuing year: President, Jacob W. Miller, New York; Vice-President, Samuel D. Babcock, New York; Secretary and Treasurer, W. F. Herbert, New York. Directors, S. D. Babcock, Charles P. Clark, George M. Miller, Edward P. Taft, John L. Riker, J. W. Miller, George G. Haven, Nathan F. Dixon, and H. F. Lippitt.

Rondout & Southwestern.—The incorporators of the company in New York are as follows: Charles D. Haines, Andrew C. Haines and Lafe Pence, of Kinderhook, N. Y.; S. D. Lake, C. R. Howell, W. H. Nesspass, H. J. Cox and P. E. Farnum, of Port Jervis, and John Milton, of Medusa, N. Y.

Seaboard Air Line.—The headquarters of W. T. Reed, Superintendent of Motive Power and machinery, was last week transferred from Raleigh, N. C., to Portsmouth, Va., where all the general officers of the company are now located.

E. E. Anderson, Chief Clerk in Capt. McBee's office, has been appointed Trainmaster of the Third (or Southern) Division with headquarters at Abbeville, S. C., to succeed Johnstone L. Busbee, transferred to the Second (or Central) Division to succeed J. M. Turner, resigned.

Southern.—P. I. Wells has been appointed Superintendent of the Third Division, with headquarters at Columbia, S. C., effective from Sept. 18. He succeeds Mr. E. Berkley, resigned.

Southern.—President Spencer last week announced that the Board of Directors elected the following officers on Sept. 18, said election to be effective Oct. 1: Alexander B. Andrews, First Vice-President, office at Raleigh, N. C.; W. H. Baldwin, Jr., Second Vice-President, office at 1300 Pennsylvania avenue, Washington, D. C.; W. W. Finley, Third Vice-President, office at 1300 Pennsylvania avenue, Washington, D. C. After Oct. 1 the duties of the First Vice-President will be those previously performed by the Second Vice-President. The duties of the Second Vice-President will be those previously performed by the Third Vice-President. The Third Vice-President will have the direction and control of traffic, the Traffic Manager reporting to him.

Tecumseh & Guthrie.—The incorporators of this company, recently organized in Oklahoma, are Henry Loop, E. B. Mundy, T. M. Phaup, G. P. Leighton, J. B. Gaylord, E. C. Nichols, A. T. Foster, S. S. Rains, D. W. Cronin, S. J. Scott, T. J. Huckaba and S. Clay, all of Tecumseh.

RAILROAD CONSTRUCTION,
Incorporations, Surveys, Etc.

Altoona & Phillipsburgh Connecting.—President S. B. Langdon, of Philadelphia, has recently awarded contracts for an extension of about 13 miles to E. A. Tennis, of Thompsontown, Pa., a contractor who has done much work on this road and other lines in Pennsylvania. The new extension starts at Rainey and will bring the road to Jonesville. From the latter town it is the intention of the officers to extend the line into Altoona, but there is nothing definite as to when this further extension will be undertaken. The road has been involved for a long time in legal complications which have delayed construction matters and delayed the development of the property. Under the recent decision of the Pennsylvania courts requiring the construction of overhead crossings where tracks of other lines were crossed, the company has built five overhead crossings of the Pennsylvania tracks in 10 miles.

Arkansas and Choctaw.—The incorporation of this company, to build a road through the southeastern counties of Arkansas into the Choctaw country in the Indian Territory, was noted last week. The company has been organized by officers of the Central Coal & Coke Co., whose headquarters are at Kansas City, Mo. The road now building starts at Ashdown, Ark., and extends northwest from that town. This year the road will only be built for a short distance from its starting point, but it is the intention to build considerable track next year. R. H. Keith is President, and John Perry, of Kansas City, is General Manager of the company.

Brainerd & Northern Minnesota.—This line, the greatest logging road in the world, has this summer laid about 25 miles of branch and 15 miles of main line, to the north end of Leech Lake, which has heretofore been only a resort for Indians. Nearly 220 carloads of logs have been dumped daily all summer into the boom limits at Brainerd, and the fall logging will begin this month. It is expected that about 100,000,000 ft. of pine will be cut by the companies operating along this road during the winter, and half as much more in the spring and summer of 1896.

Chicago, Milwaukee & St. Paul.—This road will build a branch from Merrill, Wis., into about 150,000,000 ft. of timber on Rice Creek, lately bought for logging purposes.

Choctaw, Oklahoma & Gulf.—The Middle Division of this road from South McAlester to Oklahoma City, a distance of 120 miles, was to have been opened for general traffic on Sept. 21. President Gowen, of Philadelphia, and other general officers of the company, are now in the West in connection with the opening of the new road. Portions of the new line have been operated for some time from both ends of the line west from South McAlester, about 30 miles, and east from Oklahoma City, about 40 miles. With the completion of this new line the company now has a through route from a connection with the St. Louis & San Francisco on the east to a connection with the Atchison, Topeka & Santa Fe, and the Chicago, Rock Island & Pacific near its western terminus. The prospects of a heavy traffic, now that the through line is completed and in operation, are said to be encouraging. Contracts have been made to supply coal to the Atchison, Topeka & Santa Fe, and the Chicago, Rock Island & Pacific, and it is stated that these two contracts will require at least 150,000 tons a year. Commercial sales in Kansas and Nebraska are estimated at about 100,000 tons annually. A large traffic from lumber is also said to be assured.

Depew & Tonawanda.—Prefontaine & Barrett, of Batavia, N. Y., are sub-contractors for the construction of the first section of this road from the connection with the Lehigh Valley's main line at Depew, N. Y. A cut at this point will require about four months to excavate.

Duluth & Iron Range.—Twenty-five miles of 80-lb. rails will be laid as second track this winter. The company has in contemplation for the winter outside of dock work, improvements to the amount of $200,000.

Howe Lumber Co.—This company, a Duluth concern, is to build a logging road of standard gage, into standing pine timber in St. Louis County, Minn. The company has let a contract for the road and for the logging of 50,000,000 ft. of timber to Allen & O'Callahan, of Saginaw, Mich., and work is to begin at once. It is estimated that there are nearly 1,000,000,000 ft. of standing pine that can be reached by the road when extended as planned.

International & Great Northern.—Surveys have been made by J. A. Wayland for a proposed road from Calvert, Tex., to a point on the International & Great Northern. That company agrees to lay the rails and operate the line if the citizens of Calvert will do the grading.

Lake Street Elevated (Chicago).—The extension of the Lake Street Elevated, on Lake street from Market street east to Wabash avenue, was opened for traffic Sept. 27. Trains were run at five minute intervals, and there were a large number of passengers carried, the majority of whom, no doubt, were attracted by curiosity. Commencing on Monday Sept., 23, trains ran at three minute intervals. All trains coming in from the west side will be run over this extension, and those passengers who wish to go to the old terminal at Madison and Market streets will be transferred to trains which run only between Madison street and the junction. There are three new stations on the extension—one at Fifth avenue, one at Clark street, and the terminal at State street. The station at Fifth avenue is a temporary wooden structure, and will be replaced by a better station when the Union Elevated Loop is completed. This point is the junction with that side of the loop which extends south on Fifth avenue. The advantage of having a more conveniently located terminal will no doubt result in increased traffic.

Louisville & Nashville.—The extension from Sheffield to Tuscumbia, Ala., is being vigorously pushed. Tracklaying has commenced. A large force is at work on the extension, and it is proposed to have trains running into Tuscumbia within a few days. Tuscumbia is about five miles west of Sheffield, the terminus of the Nashville, Florence & Sheffield branch.

Manistique & Northern.—Grading has begun on the the first section of the road to extend from the Marquette range to Lake Michigan, reaching a rich hardwood section. Twenty miles of work has been let. Ultimately the road is expected to be an ore carrier.

Pennsylvania.—Many of the plans for the extension of branch lines and other new construction work, the development of which was suspended about two years ago, are now being revived, as stated some weeks ago, and the company is gradually putting new construction work under contract. One of the first lines to be built will be a short connecting line, the so-called Bustleton Branch, extending from a point above the Hart's Lane crossing on the New York Division to Bustleton, a distance of about eight miles. Contracts for this new line will be let within a few days. This line is of some importance, because it will relieve the New York Branch of considerable traffic, and express trains can be run over it, thus permitting the increase of the suburban service on the New York Division between Philadelphia and Bristol, a territory which is threatened with competition by the construction of electric railroads paralleling the Pennsylvania line between the two points. Actual work on this branch had been commenced before the orders for construction work were issued by President Roberts, and it is stated that nearly $80,000 has been expended in grading common overhead crossings.

Queen Anne's.—At a meeting of directors of the Peninsular Construction Company, held in Baltimore, last week, the contract with the railroad company for building that road was ratified. W. C. Merritt, contractor for the first section from Queenstown to Denton, Md., 23 miles, has a large force at work and is expected to finish his contract this fall. This section will be operated as soon as completed. Sandford & Brooks, contractors for the wharves and other work for the harbor terminals at Queenstown, are also actively pushing operations. Douglas H. Gordon is president of the construction company, and Mr. Edward Stabler, Jr., Secretary. W. H. Bosley, of Baltimore, is President of the railroad company.

Rondout & Southwestern.—A company by this name was incorporated in New York last week and a charter filed at Albany with a capital stock of $500,000. Charles P. Haines, of Kinderhook, is the principal projector of the line. He is President of the Port Jervis, Monticello & New York road, and this new line will be practically an extension of that road. It will extend from Summitville, in Sullivan County, the terminus of the Monticello road, following the Rondout Valley to Kingston on the Hudson. Although the road goes through a mountainous country by following the valley line it can be built without unusually heavy construction work. President Haines states that he is prepared to build the road if the property owners along the route give the company free right of way.

Toledo, Ann Arbor & North Michigan.—The contract has been let for a branch of the road extending from Manistee to Sherman, Mich. The line is about three miles long, and is built to connect the Ann Arbor with several large mills at Sherman. The line is being constructed by the people of Sherman.

Washington County.—The contract for the construction of this road, undertaken by George P. Westcott and James Mitchell, of Portland, Me., provides for the commencement of actual work during October. A meeting of the stockholders will be held at Calais, Me., this month to accept the county vote granting aid to the extent of $500,000 to the project, and to approve various arrangements made by the directors. This road is to extend through the southern part of Washington County, Me., near the Shore Line from a connection with the Maine Central at to Calais near the eastern boundary line of the state.

GENERAL RAILROAD NEWS.

Atchison, Topeka & Santa Fe.—Negotiations are almost completed for the purchase by the Reorganization Committee of the company's terminal property in Chicago, the title to which is now held in part by the Chicago Elevated Terminal Company, the President of which is Joseph T. Torrence. The property to be transferred includes all the Atchison terminals in Chicago, which embrace not only the 3,000 ft. of State street property south of Twelfth street, but nearly all the company's right of way inside the city limits. The property cost about $12,000,000, and it is estimated that at a forced sale it would bring $15,000,000.

The arrangement by which the reorganization committee acquires control of the Chicago Elevated Terminal Company and its properties was carried into effect Sept. 23. It is reported on good authority that the consideration paid to the Elevated company was $400,000. This compromise will result in the withdrawal of the suits which have been commenced by both parties.

A statement has been issued by the Reorganization Committee showing the amounts of deposits of the company's securities under the reorganization plan up to Sept. 21. From this statement it appears that of the general mortgage four per cent. bonds, the total issue of which is $129,320,000 in round numbers, $127,872,000 have been deposited with the Reorganization Committee. The total issue of the second mortgage "A" bonds, amounting to $77,937,500, has been deposited with the committee. Of the income bonds of October, 1889, now outstnding the committee has received $1,253,607. Of the second mortgage "B" bonds, of which $10,000,000 were issued, the deposits amount to $9,981,000. The stock issued amounts to 1,020,000 shares and the committee has received 1,001,583 shares. The statement of the committee shows how the ownership of each issue of securities has been distributed. From this it appears that the deposits from London of general mortgage bonds amount to nearly $39,000,000, about $8,000,000 more than the deposits from Amsterdam, which is second on the list of holdings of this issue. The deposits from Boston are over $30,000,000, and from New York, more than $27,000,000. The heaviest deposits of second mortgage "A" and income bonds are from London, over $38,000,000, or more than twice the amount of the deposits from Boston, which has $18,000,000. Over $9,000,000 of the second mortgage "B" bonds, the total issue of which is only $10,000,000, are also owned in London. The largest deposits of stock have been from New York, 378,000 shares, with London second with 279,000 shares.

Chicago, Peoria & St. Louis.—The foreclosure sale in Springfield, Ill., last week, under an order from the Federal Circuit Court, was a brief affair. Paul D. Cravath, on behalf of the Reorganization Committee of the bondholders, bid the entire property in for $2,100,000.

Maine Central.—The annual report for the fiscal year to June 30 shows earnings as follows: Gross earnings and other items, $4,839,761; operating expenses, $3,035,172; income from operation, $1,804,589; income from other sources, $27,230; total income, $1,831,819—an increase of $69,886 over last year; surplus from operations, $122,370; total surplus June 30, $612,670, an increase of $115,115. The total passenger earnings were $2,097,819.20, and the number of passengers carried, 1,627,046. The total freight earnings were $2,716,642.18, and the tons of freight carried, 1,991,070.

Nashville, Chattanooga & St. Louis.—The following figures are from the annual report for the year to June 30:

	1895.	1894.	1893.
Mileage	902	884	840
Gross earnings:			
Passenger	$965,435	$1,027,327	$1,199,340
Freight	3,279,709	3,126,725	3,560,163
Miscellaneous	363,358	367,610	372,276
Total gross	$4,608,502	$4,521,662	$5,131,779
Operating expenses:			
Main. of way	$419,639	$462,211	$613,573
Main. equipment	313,386	297,060	359,376
Transportation	1,804,091	1,417,980	1,605,254
General	159,241	493,928	531,202
Total expenses	$2,726,360	$2,671,179	$3,139,405
Net	1,889,142	1,850,483	1,992,374
Total income	$1,900,566	$1,883,914	$2,162,435
Interest	952,645	902,890	891,915
Taxes	124,780	119,681	120,416
Dividends	400,000	250,000	500,000
Improvements	21,859	25,537	51,354
Rental	420,012	420,012	420,012
Total disbursements	$1,919,296	$1,718,120	$1,983,697
Deficit	18,730	Sur. 165,794	Sur. 178,738

New England.—Mr. J. Pierpont Morgan stated definitely to the newspapers this week that he held control of this road, a fact which has been generally surmised for a long time past. The purchase was made early in the spring of this year in the open market at the prices that then prevailed. The New York, New Haven & Hartford has been offered the option of purchasing the control of the New England at the price paid by Mr. Morgan to secure the controlling interest now held by him.

New York, Lake Erie & Western.—The time allowed the stockholders under the recent reorganization plan for depositing the common preferred stock and paying the proposed assessment expired on Sept. 20, and it is announced that practically all the stock of both issues had been deposited on that day and the deposits paid. This of course makes the reorganization a complete success. The assessments provided announced in this plan were $18 on common stock and $12 on preferred stock, and the first payment on installment was one-third of this amount.

New York, New Haven & Hartford.—The annual meeting of this company has been called for Oct. 16, at New Haven, Conn. The formal notice states that the stockholders will be asked to approve certain acts of the legislatures of Connecticut and Rhode Island. The Connecticut statute allows the company to absorb certain wharf and bridge privileges in New Haven, the stock of the companies controlling these privileges having long been owned by the road. The Rhode Island statute amends the charter of the Providence & Stonington Steamship Co., permitting the railroad company to fully absorb the steamship company. As is well known, the New York, Providence & Boston, which was absorbed by the New York, New Haven & Hartford a few years ago, controls the stock of the steamship company.

Norfolk & Southern.—In its report sent in to the North Carolina Railroad Commission, this road states that its increase in net earnings for the last year over the preceding year was $22,319. This road is in a very prosperous condition now. It pays the interest on its bonded debt, four per cent. on its capital stock, and has a surplus fund besides.

Norfolk & Western.—The committee having in charge the reorganization of the property announces that the plan under which it is expected that the rehabilitation of the company will be accomplished will be published in the latter part of October. The general details of the scheme have already been worked out. These have been submitted to the leading security holders both in this country and in Europe, and the committee reports that the terms proposed have been approved by influential interests, so that it is expected there will be little delay in putting the plan in operation when it is published.

Northern Pacific.—The income account of the company for the fiscal year ending June 30 has been submitted by the receivers at Milwaukee:

	1895.	1894.	Inc. or dec.
Gross earn	$17,434,980	$16,547,209	$887,771
Oper. exp	11,319,682	11,816,120	496,438
Net earn	$6,115,298	$4,731,089	$1,384,209

The Receivers have filed a report in the United States Court at Milwaukee, recommending that provisions be made for extraordinary expenditures the next five years to the amount of $9,085,000. The gross earnings for the fiscal year ended June 30 were $17,434,980, and the operating expenses $11,319,682, leaving net earnings of $6,115,298, against $4,731,089 in 1894. The floating indebtedness is $19,671,547. The mortgage indebtedness is given at $120,704,000, and the interest and sinking fund accrued at $21,677,725.

Henry C. Rouse, Thomas F. Oakes and Henry C. Payne filed their resignations as Receivers of this company with Judge Jenkins, of the United States Circuit Court for the Eastern District of Wisconsin, on Sept. 20. These resignations are the direct outcome of the conflict of authority in Northern Pacific receivership matters between the United States Circuit Courts for the districts of Eastern Wisconsin and Western Washington. It will be recalled that a few weeks ago Judges Gilbert and Hanford issued an order at Seattle, Wash., in the action brought by President Ives, directing the receivers to appear before that court on Oct. 2, and answer the charges as to their administration of the receivership, and to file an additional bond of $100,000 each. This week Judge Jenkins issued an order directing all parties in interest to appear before him on Sept. 27 to submit suggestions for the appointment of successors to the present Receivers, the natural deduction from this being that Judge Jenkins intended to maintain his jurisdiction over the Northern Pacific property as the court of primary jurisdiction in the receivership. The Receivers in presenting their resignations submit a long communication giving a history of their appointment as Receivers by Judge Jenkins and the various actions taken by them. The original action in the Receiveeship suit was brought before Judge Jenkins, and original actions in all other United States circuit courts within whose jurisdiction the Northern Pacific property lies were also brought, all the courts appointing Messrs. Rouse, Oakes and Paine as Receivers. They were also reappointed in original actions in the suit to foreclose the second and third mortgages, and each Receiver was ordered to give a bond of $500,000. For over two years these courts have recognized Judge Jenkins' court as the court of primary jurisdiction, and his jurisdiction has also been accepted by the railroad company, the creditors, the bondholders' committees and all others in interest. Under that authority the property has been adminstered as a single system. The Receivers have appeared in Judge Jenkins' court to file answers, pleas, etc., and his jurisdiction was not questioned until President Ives brought his recent suit before Judges Gilbert and Hanford at Seattle.

The Receivers say: "Your Receivers manifestly cannot administer the trust with justice to the parties interested therein or to themselves, if subject to the orders and instructions as to the general administration, from two or more independent tribunals. The property is an entirety, and the franchise under which the railroad is operated is indivisible. It is manifest that your Receivers cannot, in justice to themselves or their boudsmen, submit their accounts in a general administration of the trust to the adjudication of different tribunals. We cannot abide, nor can we ask our sureties to abide, the dangers of the difference of opinion between courts, each assuming to be controlling as to the expenditures of the receivership in the general administration, in view of the immensity of the sums involved.

"Your Receivers are not willing, under the circumstances, to file an additional bond in the Washington jurisdiction, nor are they willing to put themselves or their sureties in position to endanger their right to challenge the jurisdiction of that Court to reject or pass upon their accounts in the general administration of said trust, which since their appointment on Aug. 15, 1893, have been, upon due notice to all parties, in obedience to the orders of the United States Circuit Court for the Eastern District of Wisconsin.

"Your Receivers respectfully petitioned the honorable the Circuit Court for the District of Washington, upon the presentation of said charges, that the defendant company preferring the same be directed to present them in the first instance to this Court for trial and adjudication, not only because the nature of most of said charges seemed to render this the appropriate tribunal, but because the final disposition of said charges in this Court of primary jurisdiction, whether favorable or adverse to your petitioners, would, in the nature of things, be conclusive and protect your Receivers from being obliged to again and again defend against the same charges in the various jurisdictions.

"Your Receivers were especially influenced to urge a reference of said charges to this Court because some of them had already been disposed of on a previous trial herein and others had arisen under orders specially made by this Court, and raised the question to be decided by *that Court* whether the orders of *this Court* have or have not been obeyed. The Circuit Court for the District of Washington held, however, that so far as this Court in its judicial action in this cause is concerned, the principle of comity does not apply to this receivership. . . .

"It is self-evident that the vast system of the Northern Pacific, comprising, with its main line, beginning at Ashland, Wis., and more than 25 branch lines, a system of over 5,000 miles, with a land grant of over 38,000,000 acres, can only be administered, as it has been done, as a unit and a single system, through a single court, and not by independent tribunals, separated, moreover, by two-thirds of the continent. We venture to hope that in some way a conflict of jurisdiction and the appointment of separate receiverships, which would be productive of greatly increased expense in management, loss of earnings, demoralization of service, dismemberment, and general confusion, may be averted."

Toledo, Peoria & Western.—The annual report for the fiscal year ending June 30 makes the following comparisons:

	1895.	1894.	1893.
Gross earnings:			
Passengers	$287,480	$278,324	
Freight	587,175	546,185	
Miscellaneous	78,582	90,272	$985,632
Total gross	$953,237	$914,781	
Operating expenses:			
Maintenance way	$196. 678	$179,594	
Maintenance equip.	73,039	79,456	
Transportation	444.797	441,826	$740,407
General	29,747	29.944	
Total expenses	$744,261	$730,820	
Net earn	208,977	183,961	245,225
Total net. earn			247,490
Taxes	37,882	36,848	36,555
Interest on bonds	195,00	195,800	193,900
Other interest	6,690	1,752	4,050
Total charges	$240,372	$234,400	$234.505
Deficit	31,395	50,439	Sur. 12,985
New equipment	37,232		
Total deficit	$68,627		

Toledo, St. Louis & Kansas City.—R. B. F. Pierce, the Receiver, publishes a statement showing the earnings of the road for the year ending June 30. The gross was $1,819,399; expenses, $1,412,926; net earnings for the year, $406,472. The company owns 88 locomotives, 27 passenger cars and 2,639 freight cars in good order. The revenue of the road from its freight business for the year was $1,436,636; from passenger earnings, $271,705. The present liabilities of the company amount to $30,512,516. The track from Toledo to St. Louis is laid with a good rail weighing 62 lbs. to the yard. Within the last 18 months every bridge on the system has been rebuilt, substituting iron for wooden structures.

Union Pacific.—The report of earnings for July show the following comparisons:

	1895.	1894.	Inc. or dec.
Union Pacific System:			
Gross earn	$1,869,183	$1,668,879	I. $200,301
Oper. exp	1,189,459	1,231,135	D. 41,676
Net earn	$679,724	$437,744	I. $241,980
Net 7 mos	3,880,986	2,968,308	
Union Pacific Proper:			
Gross earn	$1,192,507	$1,091,369	I. $1,338,113
Oper. expen	748,091	710,235	I. 847,211
Net earn	$444,416	$384,134	I. $490,902
Net seven months	2,695,264	2,084,714	I. 3,587,245
Oregon Short Line:			
Gross earn	$499,266	$326,449	I. $480,140
Oper. exp	259,920	257,940	I. 295,675
Net earn	$239,346	$68,509	I. $184.465
Net seven months	1,121,573	687,687	I. 1,392,659

Valley (Ohio).—The sale of the road to Alexander Shaw and Thomas M. King, Trustees of the Reorganization Committee, has been confirmed in the United States Circuit Court at Cleveland. The Trustees will, on Oct. 1, deliver the property over to the Baltimore & Ohio, which will probably operate it with an auxiliary corporation in Ohio.

TRAFFIC.

Traffic Notes.

The Texas & Pacific has lately reduced the freight rate on corn from Texas to New Orleans and the Atchison, Topeka & Santa Fe has made a reduction on the same commodity to Galveston.

The recent dedication of the National Park at Chattanooga and the opening of the Atlanta Fair drew a good many itinerant ticket scalpers to Louisville and Chattanooga. At the latter city a dozen of these men were arrested.

The Terminal Railroad Association and the Wiggins Ferry Co. have agreed to charge demurrage on freight cars in all their territory east of the Mississippi River after Oct. 1. The business will be under the management of the St. Louis Car Service Association.

The Birmingham *News* reports that the coal mines of Alabama have this summer sent 100,000 tons of coal to Mississippi River points, mostly sugar plantations, which is more than five times the quantity sold there last year. The increase is due to the inability of the Pittsburgh miners to float their boats down the Ohio River, there having been no coal-boat rise since April.

The Philadelphia & Reading and the Pennsylvania have both reduced passenger rates on their lines in the Schuylkill Valley between Philadelphia and Pottstown. Tickets for 100 rides have been introduced, like those recently announced on other lines in the vicinity of Philadelphia, and there is also a considerable reduction in single trip tickets. On the latter, from Philadelphia to Pottstown, the reduction is from $1.20 to $1.00.

The California Traffic Association, which some time ago accepted the resignation of Mr. Leeds, the mission of the association having been deemed to have been fulfilled, seems to have changed its mind, and it now has a new Traffic Manager, Mr. W. B. Curtis. Merchants are now being asked to subscribe for the support of the association for a year from Oct. 1, and Mr. Curtis proposes to make his office valuable to them on the general plan followed in the freight bureaus at Kansas City, New Orleans and other places.

The settlement of the rate war in ocean steerage rates is in the nature of a pool or understanding under which the Continental lines agree to keep out of British territory, carrying no steerage passengers to or from Southampton. The Continental lines also agree to give the British lines six per cent. of the Continental steerage business. The British lines demanded from 15 to 25 per cent. The Scandia Line will in future be confined entirely to carrying freight; beyond this the arrangements do not contemplate any further control of the Scandinavian steerage business, which will be common to both British and Continental companies. The rates are if anything higher than they were before the rate war broke out about three years ago. The question of pooling freight has not been discussed. The North German-Lloyd, the Hamburg-American, the Netherlands and the Red Star lines have a freight pool already.

The New York State Railroad Commissioners have issued another decision in the complaint against the Manhattan, the Suburban Rapid Transit and the New York, New Haven & Hartford roads. In view of the conclusions arrived at by the board on July 17 last (reported in these columns July 26), the inquiry was directed as to the right to charge a fare of five cents between these points The Board is of the opinion that the New Haven Company has the right to charge for one ride, no matter how short, five cents, but in all other instances it must be at the rate of three cents a mile. The fare between Pelham Manor and 129th street is 25 cents—eight cents less than the legal rate. The fare is divided as follows: From Pelham Manor to Willis avenue, 20 cents; thence to 129th street, five cents. This five cents is collected on the train by employees of the Manhattan Company. The method adopted for the collection of the rental to the Manhattan Company is open to the objection that it in effect selects a particular mile of continuous ride, for which it charges and separately collects a five-cent fare, although for the remainder of the ride the rate is such as to bring the total charge within the statutory limit.

Chicago Traffic Matters.

CHICAGO, Sept. 25, 1895.

It has been somewhat of a disappointment to the eastern officials that the meeting of the Presidents last week did not reach definite conclusions, but the officials express themselves as hopeful that an agreement will finally be made which will materially strengthen the situation.

Reports from the meeting of Southwestern Missouri River lines are to the effect that all differences have been adjusted, and that the Missouri, Kansas & Texas has joined the other lines in agreeing to an advance of rates and to placing the association on its feet again. A strong committee was appointed to arrange the details, and it is predicted that Texas rates will soon be readjusted and maintained.

Eastbound freight shipments again show an increase last week over the preceding week, while lake shipments were also good, and the advance in lake grain rates was well maintained.

Rates in Western Freight Association territory are in a demoralized condition, chiefly lumber and hard coal rates. Chairman Midgley is making every effort to bring about a restoration, but without success. The first reduction in lumber rates from Chicago was made by the Burlington, a reduction from 15 cents to 10 cents per 100 lbs. from Chicago and Mississippi River points to Missouri River points, on the ground that the action of the Northwestern in reducing lumber rates from Minnesota points to the West was interfering with the business of the Burlington. The Northwestern recently reduced the rates on hard coal from Chicago and Milwaukee to Iowa and Missouri River points from $3.20 to $2.50 per ton, which was promptly met by the St. Paul and the Rock Island. On the 23d the Atchison carried the reduction to Kansas City by making a rate of $2.00 and on the 25th carried the rate to other points. This was immediately followed by a reduction to $1 to the Missouri River by the Alton and then by the other lines, and Omaha was next included. Chairman Midgley has ruled that the reduced tariffs are illegal from an association standpoint, not having been sanctioned by association action, and has ordered them withdrawn at the earliest practicable date, which will be Oct 7. There is some doubt expressed as to whether the roads will obey, for some of them are understood to have made contracts extending to Jan. 1 and beyond.

Commencing Oct. 8, the Kanawha Dispatch will put in operation an export freight service between Chicago and Hamburg via the Big Four, Chesapeake & Ohio, Newport News and the Hamburg-American Packet Company's steamers.

A meeting of officials of western lines has been called to be held at St. Louis this week to reorganize the Western Trunk Lines Association.

An attempt will also be made soon to organize a passenger association to have jurisdiction over Texas and other southwestern rates, independent of any action that may be taken by the Western Lines Association here.

The shipments of eastbound freight, not including live stock, from Chicago, by all the lines for the week ending Sept. 21, amounted to 60,988 tons, against 60,900 tons during the preceding week, a gain of 88 tons, and against 58,472 tons for the corresponding week last year. The proportions carried by each road were:

Roads.	WEEK TO SEPT. 21.		WEEK TO SEPT. 14.	
	Tons.	p. c.	Tons.	p. c.
Michigan Central	5,837	9.6	6,196	10.2
Wabash	5,338	8.7	6,181	10.1
Lake Shore & Mich. South.	8,654	14.2	7,864	12 9
Pitts., Ft. Wayne & Chicago	8,517	14.0	7,663	12.6
Pitts., Cin., Chi. & St. Louis.	9,224	15.0	7,848	12.9
Baltimore & Ohio	4,483	7.4	3,374	5.5
Chicago & Grand Trunk	7,864	12.9	9,052	14.9
New York, Chic. & St. Louis	4,638	7.6	4,482	7.4
Chicago & Erie	4,421	7.3	6,003	9.8
C., C., C. & St. Louis	2,022	3.3	2,237	3.7
Total	60,988	100.0	60,900	100.0